Canadian Aviation Safety Board

Bureau canadien de la sécurité aérienne

# Aviation Occurrence Reports

Issue 7

# AVIATION OCCURRENCE REPORTS

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## FOREWORD

## AVIATION OCCURRENCE REPORTS

In accordance with the CASB Act, part of the Board's objective is to report publicly on its investigations, on the related findings, and on any recommendations designed to eliminate or reduce safety deficiencies.

The AVIATION OCCURRENCE REPORTS Publication contains reports on CASB investigations, findings, and recommendations adopted by the Board and occurrence briefs. The sole intent in providing this information is to advance aviation safety. It is not the object of the Board to determine or apportion any blame or liability in connection with aviation occurrences.

Anyone wanting to employ the AVIATION OCCURRENCE REPORTS for purposes other than advancing aviation safety could find the information incomplete.

This publication is also available in French.

Cette publication est également disponible en français.

A limited number of copies of this publication are retained and are available from:

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This publication contains reports of aviation occurrences, in Canada, involving Canadian or foreign-registered aircraft.

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## EXPLANATORY NOTES

### *TYPES OF REPORTS*

The CASB currently produces four types of occurrence reports: there are three investigation report formats and the brief. The most common investigation report format is the Summary Report which summarizes the details of the investigation in one or two pages. Intermediate Reports are somewhat longer and more detailed. For both these types, the complete public report is reproduced in this publication. More factual information is available on Summary and Intermediate Reports and can be obtained by contacting the CASB and referencing the report number. A small number of investigations (generally 15 to 20 per year) result in International Civil Aviation Organization (ICAO) format reports. For the latter type of report, only the Synopsis and the Conclusions and Recommendations sections of the report are included in this publication. The full report can be obtained by contacting the CASB and referencing the report number (which is included with the Synopsis). An aviation occurrence brief is a short narrative history of the flight and occurrence. It includes pertinent information based on a report by the pilot or operator of the aircraft. Laboratory reports, if laboratory analysis has been carried out, are available for all three categories of reports and can be obtained in the same manner.

### *GROUPING OF REPORTS*

For ease of reference, the reports in this publication are grouped by broad category of aircraft type and by type of operation within each group. The reports are then presented chronologically (by the date of the occurrence) within each subgroup.

For fixed-wing conventional aircraft, the first subgroup is Public Transportation. This includes scheduled, other unit toll, and charter operations. Note that this subgroup is further divided into occurrences involving (i) aircraft of 5 700 kg (12,500 lb) or over and (ii) aircraft under 5 700 kg (12,500 lb). The second subgroup is Commercial Training. This includes licensed flying clubs and commercial specialty training (commercial licence classes 6 and 7, respectively). All other types of fixed-wing aircraft commercial operations are grouped under Other Commercial Operations. The Private aircraft subgroup includes all privately registered aircraft, both personal and corporate. It is further subdivided according to type of landing gear. The final subgroup contains occurrences involving state-owned aircraft.

For the rotary-wing category, there are fewer aircraft and fewer occurrences. Thus, only three subgroups are used, viz. Commercial, Private, and State.

The final category contains reports and briefs for all other types. This includes amateur-built aircraft, ultralights, gliders, balloons, etc.

### *CONTENTS OF SUMMARY REPORTS AND INTERMEDIATE REPORTS*

**Information on Aircraft:**

The first block of each report identifies the type of aircraft involved in the occurrence, the model, the registration, the location, and the date of the occurrence; for commercially operated aircraft, the operator is also identified.

**Occurrence Report Number:**

The second block commences with the occurrence report number (any queries to the CASB should carry this reference). The first two numbers identify the year of the occurrence, the first letter identifies the CASB office that conducted the investigation ('A' - Atlantic, ' Q' - Quebec, 'O' - Ontario, 'C' - Central, 'W' - Western, 'P' - pacific, 'H' - Head Office). The first number after the letter identifies the year of the

decade of the occurrence. This block also contains information on the type of investigation (a correspondence investigation is one in which the site of the occurrence was not visited by a CASB investigator), the time of the occurrence, the type of operation, the extent of damage to the aircraft, and the type of licence held by the pilot.

**Pilot Hours:**

This block indicates the total number of hours the pilot had acquired on all types of aircraft, the total number of hours on type, and the number of hours flown in the last 90 days ( in total and on type).

**Injuries:**

The injuries sustained by the crew, passengers, or others are classified as Fatal, Serious, or Minor/None (See Definitions).

**Summary Report Narrative:**

The narrative summarizes the history of the flight, pertinent factual information and analysis. The narrative is divided into two parts:

(a) the factual information or a description of what happened, which begins with a description of the history of the flight as close as possible to the occurrence, followed by the pertinent information; and

(b) an analysis of why the occurrence happened.

**Reported Circumstances: (Briefs only)**

The narrative summarizes the pertinent information based on a report by the pilot or operator of the aircraft.

**Findings: (Reports only)**

The Board's findings from an investigation are grouped under two subheadings, as follows:

Cause-Related Findings: Any element of the occurrence, found during the investigation which, if removed, would have prevented the occurrence, or, if removed, would have avoided or reduced damage to property and people.

Other Findings: Information, discovered during the investigation of an occurrence, which is not cause related but has the potential to enhance or degrade aviation safety.

**Safety Action:**

For all aviation occurrence investigations, relevant data are recorded to facilitate statistical analysis and the identification of system-wide safety deficiencies through safety studies. In cases where an individual occurrence investigation leads to significant safety action being taken, that action is included in the public report immediately after the Findings.

## DEFINITIONS

(Extracted from the Canadian Aviation Safety Board Act/Regulations)

### *"AVIATION OCCURRENCE"*

(a) any accident or incident associated with the operation of aircraft, and

(b) any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described in paragraph (a).

### *"ACCIDENT"*

"ACCIDENT" means any aviation occurrence where, at any time during the period commencing when the first person boards an aircraft for the purpose of flight and ending when the last person disembarks from the aircraft after the flight,

(a) a person other than a stowaway, sustains a serious injury or fatal injury, that is not self-inflicted or inflicted by another person or caused by natural causes, as a result of that person

  i) being in the aircraft,

  ii) coming in direct contact with any part of the aircraft, including any part that may have become detached from the aircraft, or

  iii) being directly exposed to the jet blast of the aircraft,

(b) the aircraft sustains damage or structural failure adversely affecting the structural strength, performance or flight characteristics of the aircraft and normally requiring major repair or replacement of any affected component part, other than damage or failure that is limited to

  i) the engine, its cowling, or its accessories,

  ii) the propellers, wing tips, antennae, tires, brakes or fairings, or

  iii) small dents or puncture holes in the aircraft skin, or

(c) the aircraft is missing or is completely inaccessible.

### *"SERIOUS INJURY"*

"SERIOUS INJURY" means an injury that is sustained by a person in an accident and that

(a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was sustained,

(b) results in a fracture of any bone, other than a simple fracture of the nose or of any fingers or toes,

(c) involves lacerations that cause severe haemorrhage or nerve, muscle or tendon damage,

(d) involves injury to any internal organ, or

(e) involves second or third degree burns, or any burns affecting more than five per cent of the body surface.

### *"INCIDENT"*

"INCIDENT" means an aviation occurrence, other than an accident, that affects or could affect the safe operation of an aircraft. Incidents can be reported to the CASB through mandatory or voluntary reporting mechanisms.

According to the CASB regulations a "reportable incident" means any incident involving an aircraft with a maximum certified take-off weight greater than 5 700 kg where

(a) an engine fails,

(b) smoke or fire occurs, other than an engine fire that is contained within the engine and does not result in engine failure or damage to other component parts of the aircraft,

(c) difficulties in controlling the aircraft in flight are encountered due to any aircraft system malfunction, weather phenomena, wake turbulence, operations outside the approved flight envelope, or uncontrolled vibrations,

(d) the aircraft fails to remain within the intended landing or take-off area, lands with one or more landing gear retracted, or drags a wing tip or engine pod,

(e) any crew member is unable to perform his flight duties as a result of incapacitation,

(f) decompression, explosive or otherwise, occurs that necessitates an emergency descent,

(g) a fuel shortage occurs that necessitates a diversion or requires approach and landing priority at the destination of the aircraft,

(h) the aircraft is refuelled with the incorrect type of fuel or contaminated fuel that is undetected prior to departure from the ramp,

(i) a collision or risk of collision with any other aircraft or with any vehicle, terrain or obstacle occurs, including a collision or risk of collision that may be related to air traffic control procedures or equipment failures,

(j) a flight crew member declares an emergency or indicates any degree of emergency that requires priority handling by an air traffic control unit or the standing by of a crash, fire fighting or rescue services, or

(k) toxic gases or corrosive materials leak from any cargo aboard the aircraft.

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AIR CANADA
BOEING 727-233 C-GAAJ
HALIFAX INTERNATIONAL AIRPORT, NOVA SCOTIA
24 DECEMBER 1985

REPORT NUMBER: 85-A54096 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 2045 AST
OPERATION: Scheduled Domestic
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | Unknown | Unknown |
| LAST 90 DAYS | 148 | 148 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 7 |
| PASSENGERS | - | - | 120 |

***HISTORY OF THE FLIGHT:***

The aircraft was on a scheduled domestic flight from Toronto, Ontario to Halifax, Nova Scotia. Upon reaching Halifax, the aircraft flew a front course instrument landing system (ILS) approach to runway 15. The official reported weather in Halifax was slightly above the limits required for the approach. At decision height, the pilot had visual contact with the full length of approach lights and the green threshold lights.

During the flare for touchdown, unexpected reduced visibility was encountered, thus making centre line tracking difficult. A heading correction was made for a perceived crab angle. During the landing roll, the aircraft struck three left-side runway edge markers with the left main landing gear, damaging the left outside tire. The edge markers were located 2,200, 2,400, and 2,600 feet from the runway threshold.

***PERTINENT INFORMATION:***

Runway 15 is served by an ILS having Category I weather limits. The runway visual range (RVR) is measured by a single transmissometer located adjacent to the glide path antenna in accordance with Transport Canada requirements. All airport equipment was functioning normally at the time of the incident. The runway was 100 per cent bare and wet.

The weather was essentially as forecast in the area and terminal forecasts. The aircraft landed at 2044 AST. Actual weather sequences for the period before and after the landing show that the weather was deteriorating rapidly. The sequences were as follows:

2000 Regular Special - 200 ft scattered, measured ceiling 700 ft overcast, visibility 2 mi in very light rain showers and fog, temperature +3°C, dew point +3°C, wind 120° true (T) at 13 kt, altimeter 29.85 in. Hg, stratus fractus 4/10 (at 200 ft), stratus fractus 6/10 (at 700 ft).

2020 Special - Indefinite ceiling 400 ft obscured, visibility 5/8 mi in light drizzle and fog, wind 120° T at 14 kt, fog 10/10 (sky cover).

2100 Regular Special - Indefinite ceiling 100 ft obscured, visibility 1/8 mi in light drizzle and fog, temperature 3°C, dew point 3°C, wind 120°T at 8 kt, altimeter 29.85 in. Hg, fog 10/10 (sky cover).

The following RVR readings were taken from the recorded RVR tape.

| TIME | | TRANSMISSOMETER | RVR IN FEET |
|---|---|---|---|
| | 2041 | 24A | 2400 |
| | | 24B | 1800 |
| | | 15A | 4500 |
| | 2043 | 24A | 1900 |
| | | 24B | 1800 |
| | | 15A | 3500 |
| (TOUCHDOWN) | 2044 | 24A | 1700 |
| | | 24B | 1900 |
| | | 15A | 3300 |

The transmissometer serving runway 15 was installed, maintained, and calibrated in accordance with Transport Canada criteria. Because runway 15 is served by an ILS having Category 1 weather limits, there is no requirement for a second transmissometer in the roll-out area.

The following information was extracted from the flight data recorder (FDR):

1. The approach was stabilized;

2. The aircraft was on the localizer and slightly below the glide slope approaching the runway threshold;

3. In the last four seconds before touchdown, the heading changed four degrees left; and

4. After touchdown, the aircraft went left off the localizer for eight seconds and corrected for 12 seconds to regain the centre line.

***ANALYSIS:***

The investigation indicated the night approach was normal until the aircraft crossed the runway threshold and began to flare. While correcting for the cross-wind, the aircraft entered an area of reduced visibility, causing the pilot to lose the visual alignment cues upon which he was depending.

The weather observation taken at 2100 indicated that the visibility had deteriorated rapidly. Halifax Airport is subject to the vagaries of Atlantic coastal weather conditions including rolling, wind-blown fog banks which cause differing visibilities across the airport. This phenomenon produced a situation where the edge of reduced visibility was so sharply defined that the transmissometer for runway 15 was unaffected.

There was no forewarning to the pilot of the reduced visibility. The official reported weather and the RVR reading for runway 15 indicated more than one-half mile visibility. The 24A RVR reading changed from 2,400 to 1,700 feet in the four minutes prior to touchdown. Had this information been available to the pilot, it would have alerted him to the presence of the localized fog bank.

***FINDINGS:***

**Cause Related:**
1. Upon landing the aircraft struck three left-side runway edge markers with the left main landing gear.

2. The visibility in the landing area was significantly lower than what was expected by the flight crew.

3. When the aircraft entered the area of reduced visibility, the pilot lost the visual alignment cues upon which he was depending.

**Other:**
-Nil-

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QUEBECAIR
DOUGLAS DC-8-63 C-GQBF
GULF OF ST. LAWRENCE, QUEBEC
25 DECEMBER 1985

REPORT NUMBER 85-H50008

***HISTORY OF THE FLIGHT***

Quebecair (QBA), Flight 512, was an international passenger charter flight from Montreal (Mirabel), Quebec to Paris (Orly), France. There were 247 passengers including 4 infants on board. The flight crew consisted of the captain, first officer, and a flight engineer. The cabin crew consisted of an in-charge flight attendant and six flight attendants.

At approximately 1400 EST, 25 December 1985, three and one-half hours before the planned departure time, and in accordance with the company's policy for international flights, the captain was briefed by telephone by Quebecair Flight Dispatch. Dispatch presented five proposed itineraries to the captain, who decided upon the most favourable route according to the information available. This information, which was in the captain's possession, consisted of a computer-generated flight plan, the 250 millibar (mb) prognosis chart, and the significant weather prognosis chart. The planned route of flight was via airways to Sherbrooke, Quebec direct to

St. Anthony, Newfoundland track Victor to lat 56°N, long 10°W direct to Belfast, Ireland and airways to Paris, France. The initial planned cruising altitude was flight level (FL) 290. The final planned cruising altitude was FL 370.

The cabin crew arrived at the airport at approximately 1615 in preparation for a 1730 departure. The in-charge flight attendant briefed the other flight attendants, and, during the briefing, the captain advised them of the weather en route and the possibility of turbulence after take-off. Because of a flight servicing problem, the flight was delayed for one and one-half hours.

At 1903, Flight 512 departed Mirabel and, upon contacting departure control, was instructed to proceed direct to St. Anthony, Newfoundland and to maintain FL 290. The flight informed Area Control Centre (ACC) that it could climb to FL 310 and was cleared accordingly. At 1914, Flight 512 reported that it was leaving FL 193 and climbing to FL 310. During the initial portion of the climb, the captain left the seat-belt sign on. Upon reaching FL 310, Flight 512 was handed over to Moncton ACC at 1938. The in-charge flight attendant asked if they could start the bar service, and, as they were experiencing a smooth ride, the captain turned the seat-belt sign off.

After the cabin crew of Flight 512 had completed the bar service, light turbulence was encountered, and the seat-belt sign was again illuminated. The captain made announcements in French and in English that they were expecting turbulence and advised passengers to fasten their seat-belts. The cabin crew began securing the aircraft. Some of the flight attendants proceeded up the aisle to pick up the passengers' glasses and to ensure that their seat-belts were fastened. The passengers who were not in their seats were advised to return to their seats. One flight attendant, in the forward galley, did not hear the announcements and was unaware of the expected turbulence. The other attendants were in the process of stowing the equipment when, about five minutes after the announcements, the aircraft was subjected to three sharp jolts in the space of twenty seconds.

Loose articles flew about the cabin. Two infants were separated from their mothers. Some passengers, who had not heeded the seat-belt sign and the announcements, were thrown out of their seats and sustained injuries when they struck the cabin ceiling with sufficient force to leave indentations or break through the ceiling with their heads.

One flight attendant had just sat down near the mid-galley and was fastening her seat-belt, when she was projected up and struck her head on the cabin ceiling before she fell, paralyzed, to the floor.

Three service carts, one near the forward exit and the other two in the rear galley, struck the cabin ceiling, spilled their contents, and fell to the floor in an inverted position. One service cart from the rear galley came to rest on the left side of the aircraft astride the last row of seats, which were occupied. Wine bottles smashed against the cabin ceiling, and others broke on the floor, showering passengers with broken glass and liquid. Some of the passengers sustained cuts from the broken glass. Six flight attendants suffered injuries of varying degree when thrown about or struck by flying objects.

After the accident, a physician on board the aircraft provided medical assistance to the paralyzed flight attendant, while the rest of the cabin crew administered first-aid treatment to the injured passengers and began cleaning the cabin.

At 2007:07, QBA Flight 512 reported to air traffic control (ATC) that it had encountered some severe turbulence and was requesting FL 330. Moncton ACC cleared the flight to the requested altitude.

At 2020:38, QBA Flight 512 advised Gander ACC that the flight might have to return to Mirabel because some passengers had been injured as a result of the turbulence. At 2024:06, the flight was still in turbulence, and the crew requested FL 340. At 2031:53 and 23 nautical miles west of St.Anthony, the crew advised Gander that the flight was returning to Mirabel. This decision was prompted by the doctor's recommendation. The flight exited the turbulence sector at 2122:06, abeam Natashquan.

During the return flight, the captain made arrangements for medical assistance and the removal of the injured passengers and crew members to the hospital upon arrival at Mirabel.

The accident occurred at 2007, at FL 310, in the hours of darkness off the north shore of the Gulf of St. Lawrence, near Natashquan, Quebec, at approximate lat 49°52'N, long 62°47'W. At the time of the occurrence, the moon was visible and the aircraft was clear of cloud.

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 13,800 | 425 7,570 71 |
| LAST 90 DAYS | 105 | 105 41 41 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 2 | 8 |
| PASSENGERS | - | 3 | 244 |

## *ANALYSIS*

Analysis of weather information indicated that Flight 512 encountered an area of CAT associated with the jet stream core situated over the Gulf of St. Lawrence. Analysis of DFDR information indicated that the encounter was abrupt and without warning to the crew.

## *CONCLUSIONS*

**Cause-Related Findings**

1. The flight encountered stronger than forecast clear air turbulence associated with a jet stream.

2. Although the captain had illuminated the "Fasten Seatbelt" signs and made an appropriate announcement, some passengers were thrown about because they had not fastened their seat-belts.

3. At the time of the encounter, some passenger service carts complete with their contents were not securely stowed.

4. The cabin crew were not able to secure the passenger cabin and return to their seats during the period from the captain's announcement to the turbulence encounter.

5. Five seat-belts failed during the encounter; one passenger whose belt failed sustained serious injuries.

**Other Findings**

1. The passenger service carts were of a design that did not permit rapid securing of the cart and its contents.

2. There were no suitable means available to restrain infants.

3. Thirty-five seat-belts on the accident aircraft were found to be unserviceable in a post-accident inspection.

4. Non-standard terminology was used by the pilots of other aircraft to report turbulence.

5. The aircraft was not equipped with "Fasten Seat-belt" and "No Smoking" signs in the galley areas; there was no speaker in the forward galley, and the speaker in the rear galley was unserviceable.

6. There is no regulatory requirement for an in-charge flight attendant to be designated when the cabin crew consists of more than one flight attendant nor for his or her duties to include control and coordination of cabin safety matters when one is designated.

7. The flight crew was certified and qualified for the flight in accordance with existing regulations.

8. Except as noted in Other Finding number three above, the aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

9. The weight and centre of gravity were within the prescribed limits.

10. Air traffic services was not required to relay significant weather pilot reports to Atmospheric Environment Service facilities.

## *SAFETY ACTION*

**Action Taken**

The Canadian Aviation Safety Board (CASB) notes that as a result of this occurrence, the air carrier has taken the following corrective action with respect to its two DC-8 passenger aircraft:

a) Installation of a restraint system (consisting of tie-down straps and mounting points on galley walls) for passenger service carts (PSCs) in the forward and rear galleys of the aircraft;

b) Installation of butterfly-type locks on galley storage container doors;

c) Installation of restraining nets in passenger compartment wardrobes and overhead bins used for storing emergency equipment;

d) Examination of all seat-belts in the carrier's DC-8 aircraft. Unserviceable seat-belts were repaired or replaced prior to the aircraft being released for service.

e) Publication of a revised policy regarding cabin-crew activity during periods when the seat-belt signs are illuminated due to expected turbulence. In summary, the policy states that cabin crew members are to suspend service, to secure the passenger compartment, and to be seated with seat-belts fastened whenever the seat-belt signs are illuminated.

**Action Required**

1. Cockpit/Cabin Crew Coordination When Turbulence Expected

The CASB recognizes that turbulence may be encountered with little or no warning. Thus, the successful securing of the passenger compartment requires effective teamwork by the entire crew complement.

Inter alia, such teamwork requires delegation of authority, clearly assigned responsibilities and standard operating procedures, strong interpersonal communications, and coordination to ensure mutual backup during high workload situations. In other words, for the cabin crew to be effective during emergency situations, leadership is required.

To varying degrees many airlines, such as Quebecair, designate an in-charge flight attendant. It is the Board's view that, given the additional requirements for command and control over the cabin situation in an emergency, such designated personnel must be carefully selected and trained to fulfill these added responsibilities.

At present, airlines can operate with a large cabin crew where no cabin crew member is formally identified as the team leader. Nor is any particular attention required to be given to the selection and training of any cabin team leaders, if they are so designated by the airline. The Board believes that failure to select, train, and designate formal team leaders for the cabin crew could seriously compromise the effectiveness of that crew's performance during critical periods such as in-flight turbulence encounters or an in-flight emergency. Therefore, the CASB recommends that:

The Department of Transport:

1) require designation of an in-charge flight attendant for transport category aircraft that carry passengers, and

2) specify the minimum qualifications, training standards, and responsibilities for such in-charge flight attendants.

CASB 87-50

2. Rapid and Effective Means to Secure Passenger Service Carts and Their Contents

On 24 November 1983, an Air Canada L-1011 encountered severe turbulence near Wilmington, North Carolina. During the turbulence a number of PSCs with built-in locking mechanisms were thrown about the passenger compartment, causing injuries. The CASB and the National Transportation Safety Board (NTSB) concluded that the design and maintenance of the PSC locking mechanism constituted a safety deficiency. The CASB recommended that an inspection program for the locking mechanisms be initiated and that the locking mechanism design be improved (CASB 84-05 and 84-06). These recommendations dealt with fully enclosed PSCs capable of being secured to the passenger compartment floor.

The PSCs involved in the Quebecair Flight 512 turbulence encounter were not enclosed and could not be so secured.

Since turbulence may be encountered with little warning, cabin crew must be able to rapidly secure all loose articles in the passenger compartment, including PSCs and their contents. The cabin crew's inability to rapidly secure the PSCs and their contents after the captain's announcement resulted in the unsecured PSCs and contents being thrown about the passenger compartment and contributing to the extent and severity of injuries.

Notwithstanding the action taken by the air carrier to enable cabin crew to secure the PSCs in the galley, there is still no means available to quickly secure the contents of these PSCs. Additionally, there are no regulations specifying that all types of PSCs and their contents be capable of being rapidly secured.

Therefore, the CASB recommends that:

The Department of Transport require that all types of passenger service carts and their contents be capable of being rapidly secured in the event of turbulence.

CASB 87-51

3. Passenger Use of Seat-Belts During Expected Turbulence

The use of chimes and seat-belts signs whenever turbulence is expected, as well as having cabin crew members check each passenger's seat-belt, offers reasonable assurance that passengers will remain secured for at least a brief period. To increase the probability that passengers will keep their seat-belts fastened, some airlines make flight crew announcements when the seat-belt signs have been turned on to the effect that: turbulence is expected, seat-belts must be fastened, in-flight service will be terminated, and flight attendants are to be seated with their seat-belts fastened once they have secured the passenger compartment.

The Department of Transport does not require air carriers to make announcements whenever seat-belt signs are illuminated due to expected turbulence. The Board believes that such announcements are effective in increasing passenger awareness of the hazards of in-flight turbulence and the need to keep seat-belts fastened.

Therefore, the CASB recommends that:

The Department of Transport require that in-flight procedures for air carriers emphasize the need to brief passengers fully regarding the fastening of seat-belts whenever turbulence is expected. Furthermore, such briefings should state that cabin crew are to secure the cabin and be seated with their seat-belts fastened.

CASB 87-52

4. Failure of Passenger Restraint Systems

The Board is concerned that five passenger seat-belts failed during this severe turbulence encounter, and that a further 35 seat-belt latching mechanisms, mounting points, and belts in the accident aircraft were subsequently found to be unserviceable. At present, there are no Department of Transport regulations specifying requirements for periodic inspections of passenger seat-belts in transport category aircraft. The frequency and method of seat-belt inspection is left to the operators' discretion. The Board believes that this lack of regulation regarding periodic inspection of seat-belts led to unserviceable seat-belts being released into service, thereby placing passenger lives at risk.

Therefore, the CASB recommends that:

The Department of Transport establish procedures for the periodic inspection of passenger seat-belts on transport category aircraft to ensure their continuing serviceability.

CASB 87-53

5. Significant Weather Pilot Reports

In the half hour preceding the severe clear air turbulence encounter of QBA 512, three other aircraft on a track 60 miles to the north reported moderate to heavy-moderate, bordering on severe, turbulence along cloud tops. The Air Traffic Service Manual of Operations states that

pilot reports of significant weather shall be relayed to other aircraft in the vicinity of the report; however, there is no requirement to relay such information in a timely manner to Environment Canada. Meteorological forecasters require timely reports of significant weather in updating weather forecasts, particularly in areas such as the Gulf of St. Lawrence where established weather observation sites are sparse.

Therefore, the CASB recommends that:

The Department of Transport ensure the timely relay of pilot reports of significant weather from air traffic services to the Atmospheric Environment Service.

CASB 87-54

**Other Safety Concerns**
1. Infant Restraint Systems for Use in Transport Category Aircraft

The Board recognizes that, while effective infant restraint systems suitable for use in transport category aircraft are technologically possible, non-safety-related issues make their mandatory use difficult from an air carrier's point of view. Present air carrier practice allows the carriage of infants under two years of age free-of-charge, providing an accompanying fare-paying adult occupies only one seat. This means that an infant must be held in an adult's arms. This situation affords minimal protection to an infant as witnessed by this occurrence.

Since infants will continue to be at risk under present conditions, the CASB will continue to examine on a world-wide basis the means employed by various airlines to provide a greater degree of safety to infants. It is understood that parallel efforts by the NTSB in the United States are underway at this time. The Board will follow closely the progress of the NTSB and others and will consider future safety action regarding infant restraint.

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## RISK OF COLLISION BETWEEN: BOEING 737-242 CF-NAB and VEHICLE-SNOW-PLOUGH SUDBURY AIRPORT, ONTARIO 12 JANUARY 1986

LOCAL TIME: 1743 EST
INFORMATION SOURCE: Field Investigation

BOEING 737-242 CF-NAB
REPORT NUMBER: 86-O/64004 (Incident)
OPERATOR: Nordair Limited
OPERATION: Scheduled Domestic
DAMAGE: None
PILOT LICENCE: Airline Transport
PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | N/A | N/A | N/A | N/A |
| LAST 90 DAYS | N/A | N/A | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 5 |
| PASSENGERS | - | - | 26 |

SNOW-PLOUGH
REPORT NUMBER: 86-O/64004 (Incident)
OPERATOR: Department of Transport
OPERATION: Snow Removal (Sweeper)
DAMAGE: None

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *HISTORY OF THE FLIGHT:*

The aircraft, operating as Nordair Flight 872, a regularly scheduled passenger flight to Ottawa, Ontario, was cleared for take-off from runway 04. On initial climb-out, the aircraft passed over the top of a snow removal vehicle, Truck 81, clearing snow from the intersection of runways 04/22 and 11/29. The flight crew advised the air traffic controller of the incident, continued the climb-out, and proceeded to destination without further incident.

### *PERTINENT INFORMATION:*

The air traffic services controller associated with the occurrence was in the control tower by himself, controlling both the ground and air positions. The second controller on duty was absent from the tower, on break,

and returned to the tower cab just as the occurrence took place.

Truck 81, a snow-plough with a runway sweeper in tow, was authorized to work unrestricted on the airport runways and taxiways . The authorization was issued on the ground control frequency, which was the frequency monitored by the truck operator from the time he drove onto the airport until the time of the occurrence.

Approximately five minutes after the snow-plough had been authorized to proceed onto the airport, Nordair Flight 872 contacted the controller on the ground control frequency requesting taxi authorization from the terminal ramp and was authorized to taxi to position on runway 04. While the aircraft was taxiing, the controller, after issuing the instrument flight rules en route clearance to the flight crew, requested they change to the tower frequency. While the aircraft was still on the taxiway, the controller cleared the flight for take-off on the tower frequency. Approximately 1 minute and 20 seconds later, the controller issued instructions on the ground control frequency to Truck 81 to hold short of runway 04. The truck operator replied holding short of the runway, and, seconds later, the flight crew enquired as to what the truck was doing on the runway. It was later determined that the snow-plough had entered runway 04 before receiving the hold short instruction, but after the aircraft had commenced its take-off run.

The 1800 EST weather observation taken at the Sudbury Airport indicated sky partially obscured, ceiling measured 2,000 feet overcast, with the visibility three miles in light snow showers and blowing snow. The wind was from 010 degrees at 21 knots gusting to 32. The flight crew estimated the visibility to be one and a half to two miles in blowing snow.

***ANALYSIS:***

The snow-plough operator was not monitoring the tower frequency when the aircraft was cleared for take-off and the flight crew was not monitoring the ground control frequency when the snow-plough was authorized to proceed onto the airport; consequently, neither was aware of the other's position or intention at the time of the occurrence. The air traffic controller did not issue instructions for the snow-plough to clear the runway prior to issuing take-off clearance to the aircraft.

***FINDINGS:***

**Cause Related:**
1. The air traffic services controller issued take-off clearance to the aircraft after issuing clearance to the snow-removal vehicle.

2. The truck operator was not told to vacate the runway until 1 minute and 20 seconds after the take-off clearance had been issued.

3. The visibility was restricted by snow and blowing snow.

**Other:**
-Nil-

***SAFETY ACTION:***

**Action Taken:**
It its Report on a Special Investigation into the Risk of Collisions Involving Aircraft on or Near the Ground, the Canadian Aviation Safety Board (CASB) stated that the ability to detect aircraft and vehicles operating on or near manoeuvring surfaces can be enhanced significantly by measures to increase conspicuity when viewing is from a cockpit, a control tower, a Flight Sevice Station (FSS), or a vehicle tower, a Flight Service Station (FSS), or a vehicle cab. Appropriate lighting schemes are particularly effective in this regard. Therefore CASB recommended that:

The Department of Transport, following watever additional research is necessary, implement additional measures for increasing the conspicuity of aircraft and vehicles operating on or near airport surfaces by amending current operating practices and, where necessary, the equipment requirements for aircraft and vehicles.

AIR FRANCE
BOEING 747-200, F-BPVM
MIRABEL AIRPORT, QUÉBEC
26 JANUARY 1986

REPORT NUMBER: 86-Q64901 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2335 EST
OPERATION: Scheduled International
DAMAGE: None
PILOT LICENCE: Airline Transport

PILOT HOURS:

| | ALL TYPES | | ON TYPE | |
|---|---|---|---|---|
| | PILOT | CO-PILOT | PILOT | CO-PILOT |
| TOTAL | 22,000 | 8,000 | 2,800 | 2,000 |
| LAST 90 DAYS | 165 | 150 | 165 | 155 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 15 |
| PASSENGERS | - | - | 153 |

## *HISTORY OF THE FLIGHT:*

An Air France, Boeing 747-200, Flight 032 was lined up for take-off on runway 06 with the body gear locked and aligned. Shortly after advancing the thrust levers, the captain lost directional control of the aircraft. Unable to regain control, the captain rejected the take-off and selected the thrust reversers. The aircraft departed the runway 800 feet from the threshold and came to rest on a heading of 102 degrees magnetic, 390 feet off the edge of the runway. All occupants deplaned the aircraft normally and without further incident.

## *PERTINENT INFORMATION:*

Approximately 30 minutes before the attempted take-off, an Air Traffic Information Service (ATIS) message was issued following a weather observation. The message indicated the following weather conditions:

- 400 ft thin broken, precipitation ceiling 1,400 ft obscured; visibility 1 1/4 mi in light snow, temperature –1° C, dew point –2° C, wind calm, altimeter 29.57 in. Hg.

At the time of the occurrence, runway 06 was 100 per cent covered with one-eighth of an inch of loose snow, and the braking action, taken at 2330 EST from a James Brake decelerometer, showed a reading of 0.35, indicative of poor braking action. The runway conditions and braking index were issued and acknowledged by Flight 032, three minutes before lining up on the runway. Slippery conditions on the runway had been reported since mid-afternoon.

An aircraft which had landed 20 minutes earlier reported the braking action on runway 06 as nil to poor and on the taxiways as fair. A Swissair DC-10 aircraft took off from the same runway just ahead of Flight 032. Runway 06 was last urea coated 13 hours before the incident. Runway 06 was used for both take-offs and landings, in accordance with the priorities established in the airport snow removal operations manual.

The captain was at the controls and handling the thrust levers. The Air France B747 operating manual states that the thrust levers should be advanced to 1.10 EPR until all engines are stabilized before advancing the thrust levers to the take-off power setting. Boeing performance manuals state that it is imperative the engines be stabilized prior to advancing the thrust levers, so as to prevent asymmetric thrust conditions. Small differential thrust lever settings between engines number one and number four can create relatively large directional movements during take-off, on slippery runways.

Analysis of the digital flight data recorder (DFDR) did not indicate any engine stabilization at 1.10 EPR. The DFDR read-out indicated that the number two and three engines accelerated continuously and simultaneously following power application to the take-off power setting of 1.40 EPR. Meanwhile, the number one and four engines accelerated to 1.20 EPR. However, the number one engine reached 1.20 EPR earlier than the number four engine. The aircraft heading veered to the right following the power application, and full left rudder was applied in response to this heading change.

The power on the number one engine was then reduced to 1.10 EPR while the number four engine was still accelerating to 1.20 EPR. The aircraft then veered left, at which time, the number one thrust lever was advanced to the take-off power setting of 1.40 EPR, the number two and three engines were reduced to idle power, and then the number four engine was reduced to 1.10 EPR. Full rudder deflection to the right also took place.

The aircraft then veered sharply to the right, at which time, all thrust levers were retarded and the thrust reversers selected. The number one thrust reverser did not activate, as the thrust lever had not been retarded completely to idle. The maximum forward speed recorded on the DFDR was 53 knots.

## *ANALYSIS:*

Because the EPRs were not stabilized at 1.10 before the thrust levers were advanced for take-off, the number one and four engines accelerated unevenly. The resulting

asymmetric thrust caused the aircraft to veer. The subsequent application of differential thrust and rudder in an attempt to straighten the aircraft aggravated a situation already complicated by a very slippery runway. Unable to regain directional control, the captain rejected the take-off and selected reverse thrust, but he was unable to prevent the aircraft from departing the runway.

The design of the thrust reverser system prevents the selection of reverse thrust if the thrust lever is not retarded to the idle position. Because the captain had not retarded the number one thrust lever completely to idle, the number one thrust reverser did not activate when selected.

### *FINDINGS:*

**Cause Related:**

1. The aircraft EPRs were not stabilized to 1.10 prior to the application of take-off thrust, causing uneven engine accelerations.

2. The extremely slippery runway conditions, resulted in a loss of directional control and the aircraft subsequently left the runway.

**Other:**

1. The captain attempted to select the number one thrust reverser without first retarding the thrust lever to the idle position.

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## RISK OF COLLISION BETWEEN: BOEING 727 C-GAAR and PIPER PA-28 CHEROKEE C-GQEU HALIFAX AIRPORT, NOVA SCOTIA 20 FEBRUARY 1986

LOCAL TIME: 1017 AST
INFORMATION SOURCE: Field Investigation

BOEING 727-233 C-GAAR
REPORT NUMBER: 86-A64009 (Incident)
OPERATOR: Air Canada
OPERATION: Scheduled Domestic
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 7 |
| PASSENGERS | - | - | 62 |

PIPER CHEROKEE PA-28 C-GQEU
REPORT NUMBER: 86-A64009 (Incident)
OPERATOR: Halifax Flying Club
OPERATION: Flying Club Training
DAMAGE: None
PILOT LICENCE: Student Pilot Permit

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *HISTORY OF THE FLIGHT:*

The Boeing 727 (AC602) was cleared by Halifax Terminal Control for a visual approach to runway 06. The tower controller subsequently cleared the aircraft to land on runway 06. When AC602 was approximately two miles on final, the pilot detected an aircraft in position on the runway and queried the controller. AC602 was then instructed to go around.

### *PERTINENT INFORMATION:*

Runway 06 was being used for departures and arrivals. At the time of the incident, the traffic volume was light. The tower controller had three aircraft to monitor: AC602; C-GQEU, a Piper Cherokee awaiting take-off clearance; and another aircraft which was clearing the control zone to the east. The tower controller had cleared the Cherokee to position on the runway from taxiway Charlie and two minutes later issued the landing clearance to AC602.

Runway 06 slopes such that the threshold is not visible from the tower. Taxiway Charlie is approximately 2,600 feet from the threshold of runway 06 and 4,500 feet from the tower. Light aircraft on the runway beyond taxiway Charlie cannot be seen from the tower.

Halifax control tower is equipped with Mylar window shades which may be raised or lowered at the discretion of the controller. At the time of the occurrence, the shade on the window facing taxiway Charlie was approximately three-quarters lowered, which placed the bottom bar of the window shade at eye level.

### *ANALYSIS:*

The standard procedure for controllers is to scan the runway before issuing take-off or landing clearance. The Cherokee was in a position on the runway where it was

at the extremity of the visual range from the tower. In this case, when the controller scanned the runway, the bottom bar on the window shade was directly in his line of sight, and he did not see the aircraft. However, he could have changed position so that the aircraft would not have been hidden by the shade. During the two-minute interval between clearing the Cherokee to position on runway 06 and clearing AC602 to land, the controller forgot about the Cherokee.

*FINDINGS:*

**Cause Related:**
1. The controller forgot that he had cleared the Cherokee aircraft to position on the runway.

2. The controller did not carry out a thorough runway scan before he cleared AC602 to land.

**Other:**
1. Light aircraft positioned on runway 06 beyond taxiway Charlie cannot be seen from the tower.

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CANADIAN PACIFIC AIRLINES
BOEING 737-317 C-FCPI
TORONTO/LESTER B. PEARSON
INTERNATIONAL AIRPORT, ONTARIO
01 MARCH 1986

REPORT NUMBER: 86-O/64025 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0745 EST
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 6 |
| PASSENGERS | - | - | 98 |

*HISTORY OF THE FLIGHT:*

The Boeing 737 rolling on runway 33 was leaving Toronto, Ontario for Acapulco, Mexico. After attaining critical engine failure recognition speed ($V_1$), the crew felt the aircraft shudder and observed the left main landing gear unsafe light illuminate. The take-off was continued, and, after the aircraft was safely airborne, the landing gear was retracted. With the landing gear retracted, all landing gear indications were normal. The landing gear was then selected down, and the left main landing gear unsafe light illuminated and remained illuminated. Shortly thereafter, airport personnel discovered that a landing gear tire had shed recapping rubber on the runway. Metal fragments were also found on the runway. The captain advised air traffic services that the flight would return and land at Toronto after fuel was burned off to lighten the aircraft load. The aircraft was flown in the Toronto local area for approximately three hours, during which time the flight crew assessed the damage to the aircraft and crash rescue crews were readied for the landing.

The aircraft landed on runway 24 Right at Toronto, with the left landing gear unsafe light illuminated. The touchdown and roll-out were normal, and the aircraft was towed to a main terminal gate after the landing gear had been secured down with manual locking pins. All passengers and flight crew disembarked at the terminal gate in a routine manner.

*PERTINENT INFORMATION:*

The runway was bare and dry, the wind was from the west at six knots and the temperature was –11 degrees Celsius.

The entire tire tread had separated from the inboard left main landing gear while the aircraft was travelling along the runway at a speed between 148 and 152 knots. The tire remained inflated throughout the take-off, the landing and the landing roll. The trailing edge of the left wing trailing edge flap directly behind the left inboard tire and the left main landing gear down sensor switch were damaged.

The failed tire was a fourth-time recap, with approximately 197 take-offs and landings recorded since installation. The company reported having failures of recap tires used on nearly all the 737-300 series aircraft. The cause of the failures has not been established.

*ANALYSIS:*

The tire tread separated from the tire for undetermined reasons. The loose tire tread struck the left main landing gear down sensor, damaging the sensor and rendering it unserviceable. The unserviceable sensor switch caused the left main gear unsafe light to illuminate in the cockpit, even though the landing gear was down and locked. The left trailing edge flap was damaged by the loose tire tread.

*FINDINGS:*

**Cause Related:**
1. For undetermined reasons, the left inboard main landing gear tire tread separated from the tire during the take-off roll.

2. The loose tire tread damaged the left main landing gear down sensor switch, rendering it inoperative.

**Other:**
-Nil-

*SAFETY ACTION:*

**Action Taken:**
Since this occurrence, the operator has amended its policy with respect to recapped tires on Boeing 737-300 series aircraft. Only new tires are now installed on these aircraft.

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EASTERN AIR LINES INC.
BOEING 727-225 N8848E
TORONTO/LESTER B. PEARSON
INTERNATIONAL
AIRPORT, ONTARIO
10 MARCH 1986

REPORT NUMBER 86-O60901

PILOT HOURS:

| | CAPTAIN | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 10,594 | 2,922 | 9,619 | 3,676 |
| LAST 90 DAYS | N/A | 74 | 74 | 202 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 7 |
| PASSENGERS | - | - | 83 |

*SYNOPSIS*

The aircraft was on a transborder scheduled flight from Pittsburgh, Pennsylvania, U.S.A. to Toronto, Ontario. As the captain initiated the landing flare, the aircraft flew into a fog bank. The aircraft ran off the left side of the runway and continued for approximately 1,200 feet before coming back onto the runway. While the captain was attempting to align the aircraft with the runway centre line, the right wing tip struck the runway surface, and the right outboard main wheel was torn off the axle. The extent of damage was not realized until the aircraft had reached the gate and the passengers had been deplaned.

The Canadian Aviation Safety Board determined that, when the aircraft entered the fog bank, the captain lost visual reference with the runway, and the aircraft ran off the left side of the runway.

*FINDINGS*

**Cause-Related Findings**
1. The aircraft encountered an unexpected fog bank during the flare for landing.

2. The high airspeed, aggravated by the tail wind on approach, resulted in a long touchdown and entry into the fog.

3. The reflection from the landing lights in the fog combined with the nose-high attitude of the aircraft reduced the visibility such that the captain lost visual reference with the landing environment.

4. The captain continued with the landing rather than conducting a go-around.

5. After losing visual reference, the captain was unable to maintain directional control, and the aircraft ran off the left side of the runway.

6. While the captain was attempting to regain the runway centre line, the right wing tip struck the runway surface and side loads sufficient to cause the loss of the right outboard main wheel were induced.

**Other Findings**
1. The crew erased the cockpit voice recorder before examining the aircraft for possible damage.

2. The RVR for runway 06L was not operating at the time of the accident.

3. The actual weather conditions were significantly below the conditions forecast by either Eastern Air Lines or Environment Canada.

4. The captain, by turning off the landing lights himself, momentarily diverted his attention from the control of the aircraft.

5. Analysis of the events immediately before and during the accident sequence was hindered by the limited information available on the foil-type FDR.

6. The flight crew was certified and qualified for the flight in accordance with existing regulations.

7. The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

8. There was no evidence of any airframe failure or system malfunction prior to or during the flight.

9. The weight and centre of gravity were within the prescribed limits.

### *SAFETY ACTION*

The Board has no aviation safety recommendations to issue at this time.



## BRADLEY AIR SERVICES LIMITED
## HAWKER SIDDELEY HS748 C-GDOV
## OTTAWA INTERNATIONAL AIRPORT, ONTARIO
## 9 MAY 1986

REPORT NUMBER: 86-O/64065 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0705 EDT
OPERATION: Scheduled International
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 4 |
| PASSENGERS | - | - | 11 |

### *SUMMARY REPORT:*

First Air Flight 900 (C-GDOV) was cleared for take-off from runway 14 by the tower controller and commenced the take-off run. A Focker F-28 aircraft, Pilgrim Flight 830, was cleared by the ground controller to taxi along Bravo taxiway for departure from runway 07. When the tower controller observed the F-28 taxiing toward runway 14, he suspected it was going to taxi through the intersection of runway 14 and Bravo taxiway and instructed the First Air 900 flight crew to reject the take-off. The First Air crew complied with the instruction and stopped their aircraft short of the intersection. The F-28 taxied through the intersection en route to runway 07.

The weather was scattered cloud with visibility greater than 25 miles and therefore not a factor.

Air Traffic Services airport operation policy requires that tower controllers and ground controllers coordinate all aircraft movements before issuing clearances to use runways other than the primary runway. Runway 07 was the primary departure runway at the time of the occurrence.

Coordination between the tower and ground controllers did not take place prior to the tower controller's issuing take-off clearance to First Air 900 from runway 14.

The runway incursion took place when Pilguin Flight 830 was issued unrestricted taxi clearance to the holding bay of runway 07. The First Air 900 crew successfully rejected their take-off when instructed and avoided the conflicting traffic.

### *FINDINGS:*

**Cause Related:**
1. Take-off clearance was issued to an aircraft for a non-primary runway without coordination between the tower and the ground controller.

2. The ground controller issued taxi instructions for an aircraft taxiing for departure from the primary runway to taxi across another runway in front of a departing aircraft.

**Other:**
-Nil-

RISK OF COLLISION BETWEEN:
MCDONNELL-DOUGLAS DC-9 C-FTLM and
CANADAIR CL-601 C-GCFI
OTTAWA INTERNATIONAL AIRPORT, ONTARIO
14 MAY 1986

LOCAL TIME: 1000 EDT
INFORMATION SOURCE: Field Investigation

MCDONNELL-DOUGLAS DC-9 C-FTLM
REPORT NUMBER: 86-O/64068 (Incident)
OPERATOR: Air Canada
OPERATION: Scheduled Domestic
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 5 |
| PASSENGERS | - | - | 86 |

CANADAIR CL-601 C-GCFI
REPORT NUMBER: 86-O/64068 (Incident)
OPERATOR: Department of Transport
OPERATION: State
DAMAGE: None
PILOT LICENCE: N/A

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | N/A |
| PASSENGERS | - | - | N/A |

***HISTORY OF THE FLIGHT:***

The Douglas DC-9 was operating under instrument flight rules (IFR), on a domestic Class I Scheduled Commercial Air Service. It departed runway 07 as Air Canada Flight 167, maintained the runway heading to 3,000 feet, then turned left to a heading of 270 degrees to climb to 17,000 feet.

One minute later a Canadair CL-601, operating as Transport 200, departed the same runway under visual flight rules (VFR) and was cleared by the tower controller to maintain the runway heading to 2,000 feet, turn left, climb to 5,000 feet and proceed north of the airport. The DC-9 was in the left turn to 270 degrees and climbing through 4,700 feet, when the crew saw the CL-601 to the left climbing towards them. The DC-9 took evasive action to the right. The crew of the CL-601 visually sighted the DC-9 at their one o'clock position, two miles. The CL-601 passed behind and below the DC-9.

***PERTINENT INFORMATION:***

When the DC-9 departed from runway 07, the crew selected radios to the assigned departure frequency, maintained the runway heading to 3,000 feet, then entered a left turn for a heading of 270 degrees in compliance with instructions received from departure control.

The CL-601 crew departed from the same runway, continued to monitor the tower frequency while maintaining a runway heading to 2,000 feet, then entered a left climbing turn to a northerly heading, in compliance with instructions received from the tower controller. This resulted in the CL-601 turning inside of the DC-9 and placed the two aircraft on a collision course.

There was no air traffic services (ATS) traffic advisory passed to either aircraft which were monitoring different radio frequencies. The system of communication at Ottawa is such that it is possible to have eight different aircraft in the control zone on eight different frequencies. The only clearance that was heard by both the DC-9 and the CL-601 was the take-off clearance given to the DC-9. This would not enable the crew of the CL-601 to know what direction the DC-9 was heading or what height it would be climbing to after take-off. Because both of the aircraft were operating in VFR weather conditions, it was the responsibility of both aircraft crews to provide visual separation.

The traffic conditions at the time of the incident were described as light but complex, with construction being carried out on one taxiway. There were four runways in use. The weather at the time was scattered clouds at 7,000 and 9,000 feet, visibility 10 miles.

Ground control had instructed the DC-9 to taxi to runway 07, although information passed to the tower controller indicated that the DC-9 would depart from runway 25. This resulted in a delay and some last minute changes.

The radar being used by the tower controller was operating intermittently and, during the time in question, had ceased to function and was being serviced by a technician.

The Ottawa Airport has a mix of traffic, both civil and military, and there is a great deal of training and testing conducted at the airport. Flight training and flight testing of navigational facilities tend to use non-standard procedures that disrupt the control and flow of normal

traffic or cause sudden complex situations. This problem was aggravated by intermittent radar equipment.

*ANALYSIS:*

Faulty radar equipment and a breakdown in communications within the ATS facility between ground control, tower control, and departure control allowed a conflict between the DC-9 and CL-601 to develop without detection. As a consequence, traffic advisories were not passed by the ATS facility to either aircraft, which at the time, were listening on different frequencies.

*FINDINGS:*

**Cause Related:**
1. A breakdown in communications within the ATS facility allowed a risk of collision between IFR and VFR traffic to develop.

2. The radar equipment in the control tower was inoperative at the time of the occurrence.

**Other:**
-Nil-

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NUNASI-CENTRAL AIRLINES LTD.
DOUGLAS DC-3 C-FGHL
NEJANILINI LAKE, MANITOBA
17 MAY 1986

BRIEF NUMBER: 86-C60035 (Accident)
LOCAL TIME: 1200 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 7,300 | 2,200 | 1,900 | 900 |
| LAST 90 DAYS | N/A | 200 | 200 | 250 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | 2 |

*REPORTED CIRCUMSTANCES:*

During roll-out on a prepared ice strip on a lake, the aircraft's main wheels broke through the top layer of ice. The aircraft nosed down, travelled about 30 feet on its main wheels and nose section, then stopped in its normal three-point attitude.

The ice strip measured about 5,200 feet by 100 feet and had been prepared four days earlier. In the area where the aircraft broke through, the good ice was covered with 6 to 12 inches of water and topped by another layer of ice. Ambient temperatures during the previous four days had fluctuated above and below freezing, and, at the time of occurrence, the temperature was about five degrees Celsius. A ground inspection of the ice had not been carried out prior to the flight's arrival.

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QUÉBECAIR LTD.
BOEING 737-200 C-GQBH
WABUSH, NEWFOUNDLAND
20 JULY 1986

REPORT NUMBER 86-A60024

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 14,000 | 3,500 | 9,500 | 1,900 |
| LAST 90 DAYS | 160 | 160 | 120 | 110 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 6 |
| PASSENGERS | - | 1 | 57 |

*SYNOPSIS*

The aircraft was on a scheduled flight from Wabush, Newfoundland to Sept-Îles, Québec. On take-off at a speed between 114 and 126 knots, a bird was ingested into the left engine. The engine lost power, and the crew rejected the take-off. The aircraft came to a stop in a bog 200 feet beyond the end of the runway.

The Canadian Aviation Safety Board (CASB) determined that, because the runway was wet, the distance required to stop the aircraft exceeded that which was available. Pre-flight take-off performance calculations did not take into account the effects of the wet runway, nor was such a calculation required by regulation.

*FINDINGS*

**Cause-Related Findings**

1. As the aircraft speed approached V1*i*, *a seagull was ingested into the left engine, and, as a result, the engine lost power.*

2. In accordance with established procedures, the captain elected to reject the take-off.

3. Pre-flight take-off performance calculations did not take into account the effects of a wet runway, and, as a result, the distance required to stop the aircraft exceeded the distance available.

4. Although it is known that wet runways increase stopping distances, existing airplane flight manuals do not provide data which take into account the effects of wet runways on accelerate-stop distances.

**Other Findings**

1. The flight crew was certified and qualified for the flight in accordance with existing regulations.

2. The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

3. The weight and centre of gravity were within the prescribed limits.

*SAFETY ACTION*

**Action Required**

1. Take-off Performance Requirements-Wet Runway Operations

Under current certification criteria for transport category aircraft, take-off speeds and performance calculations (including accelerate-stop distance requirements) are based upon a smooth, dry and bare runway. A wet runway reduces the braking efficiency of an aircraft during a rejected take-off, resulting in increased accelerate-stop distances. Manufacturers and regulatory authorities have established take-off distance requirements for transport category aircraft when standing water of one-quarter or one-half inch in depth is present. However, similar accelerate-stop distance calculations for wet runways, where there is no measurable amount of standing water, have not been made due to the variable effect on aircraft deceleration performance of such factors as tire design and condition, aircraft type, runway surface type and condition.

As a consequence, take-off performance calculations are based upon the following runway conditions: either the runway is smooth, bare and dry or it is "cluttered" (e.g., with measurable amounts of water or slush). Flight crews are faced with a difficult decision when a runway is wet (but not cluttered) and performance calculations (based upon a dry runway) indicate that the take-off distance required is equal to or near the length of runway available. Air carrier procedures state that flight crews can reduce the required length of runway by reducing the aircraft take-off weight. This reduction in take-off weight can only be achieved through a reduction in payload (passengers and freight) or fuel. Reducing payload would have a negative economic impact, and air carriers normally do not carry fuel in excess of operational requirements. Furthermore, air carriers are reluctant to reduce the aircraft take-off weight as the resultant performance benefit for a wet runway take-off cannot now be reliably measured. As a consequence, wet runway take-offs do not always provide a margin of safety comparable to that for dry runway take-offs.

Providing that the accelerate-stop distance required for a dry runway is less than the take-off run available (including the stopway), air carriers do have another alternative; i.e., reduce the critical engine failure recognition speed V1*i in accordance with performance data contained in airplane flight manuals.*

Reduced V1*i speeds result in less runway being used during the acceleration to V1i and less stopping distance being required because of the lower peak speed attained. The combined effect contributes to an increased safety margin during a rejected take-off. However, use of reduced V1i speeds is not fully supported by air carriers. In addition, the calculations required to determine minimum-allowable reduced V1i speeds require flight crew to perform relatively complex graph analysis.*

After discussion with a number of air carrier flight operations personnel, the CASB believes that flight crews have minimal knowledge of how to increase the margin of safety when operating off wet runways. Additionally, the CASB is aware that flight crews have doubts about the adequacy of current criteria for operating on contaminated runways.

In view of the absence of certificated performance data and the apparent lack of knowledge on the part of flight crews regarding wet runway take-off performance, the CASB recommends that:

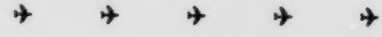
The Department of Transport revise air carrier procedures involving wet runway take-off operations, in order to provide a margin of safety comparable to that for dry runway operations.

CASB 87-45

The Department of Transport require air carriers to improve flight crew knowledge of the effects of wet run-

ways on take-off performance and the means available to flight crews to provide a margin of safety comparable to that for dry runways.

CASB 87-46



ATHABASKA INDUSTRIES
AERO COMMANDER 500B C-GGSP
FOND DU LAC, SASKATCHEWAN
21 DECEMBER 1985

REPORT NUMBER: 85-C50096 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1342 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,243 | 110 |
| LAST 90 DAYS | 100 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 6 |

***SUMMARY REPORT:***

The aircraft departed Stony Rapids on a visual flight rules (VFR) flight for Fond du Lac, Saskatchewan. About 15 miles east of destination, light freezing rain was encountered which resulted in reduced forward visibility because of windshield icing. The first attempt to land was abandoned, and, during the second attempt to land, the aircraft stalled and struck the ground short of the runway; the nosewheel collapsed, causing substantial damage.

The aircraft weight and centre of gravity were within the prescribed limits.

When the aircraft encountered the light freezing rain, the pilot decided to continue the flight. At destination, the initial landing attempt was rejected because of the restricted visibility, and the pilot opened a side window and attempted to scrape ice off the windshield to improve his forward visibility. During the second landing attempt, the pilot concentrated on maintaining visual contact with the runway and inadvertently allowed the airspeed to decrease, resulting in the stall.

***FINDINGS:***

**Cause Related:**
1. The pilot continued flight in freezing precipitation which reduced forward visibility.

2. Because the pilot was concentrating on maintaining visual reference with the ground, he inadvertently allowed the airspeed to decrease, resulting in the stall.

**Other:**
- Nil -

GOOSE BAY AIR SERVICES LTD
DE HAVILLAND DHC-2 C-GUBD
BORDER BEACON, LABRADOR 25 nm N
10 JANUARY 1986

REPORT NUMBER 86-A60003

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7,000 | 2,500 |
| LAST 90 DAYS | 144 | 78 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 2 | 1 |

***HISTORY OF THE FLIGHT***

The DHC-2 Beaver aircraft, C-GUBD, departed base camp at Lake Notakowanon, Labrador at 1025 Atlantic standard time (AST), on a caribou spotting flight. On board were the pilot and three passengers. The area of operation was over hilly terrain with deep valleys and ravines. The aircraft was flying east along the north side of a valley at an altitude of 1,000 feet above the valley floor, when one of the passengers spotted caribou tracks. The pilot started a right turn using about 25 degrees of bank. About two-thirds of the way through the turn, the aircraft suddenly rolled left and pitched nose-down, turning toward the south wall of the valley in a high rate of descent. The pilot applied full engine power and levelled the aircraft but was unable to clear or turn away from the valley wall. The aircraft struck the side of the valley, left wing first, and travelled approximately 100 feet before coming to rest on a heading 90 degrees to the left of the direction of the flight. The pilot and two of the passengers were seriously injured.

The accident occurred at lat 55°45'N, long 63°18'W at an elevation of approximately 1,500 feet above sea level (asl), at 1045 during the hours of daylight.

### *ANALYSIS*

The aircraft was operating in an area conducive to downdrafts; however, cues which often alert a pilot to the presence of downdrafts were not evident during this flight. The aircraft encountered downdrafts that caused it to roll toward and descend below the wall of the valley. The pilot levelled the aircraft and applied full power, but, because of the low altitude and the closeness of the valley wall, he was unable to turn the aircraft away from or climb over the valley wall.

As a result of the impact, the occupants were subjected to lateral and forward forces. The passengers did not have their seat-belts fastened, and, as a result, the seriousness of their injuries was increased.

The aircraft was equipped with a serviceable ELT which led to the timely discovery of the accident site and the rescue of the occupants by SAR. The relatively short period of time between the occurrence and the rescue ensured the survival of the more seriously injured occupants.

### *FINDINGS*

**Cause-Related Findings**

1. The aircraft encountered downdrafts, and the pilot was unable to recover from the effects of the downdrafts before the aircraft struck the valley wall.

2. The passengers did not have their seat-belts fastened, and, as a result, the seriousness of their injuries was increased.

**Other Findings**

1. The pilot was certified for the flight in accordance with existing regulations.

2. The aircraft was certified, and maintained in accordance with existing regulations and approved procedures.

3. There was no evidence of any airframe failure or system malfunction prior to or during the flight.

4. The aircraft's weight and centre of gravity were within the prescribed limits.

5. The aircraft was not equipped with a tent which is part of the required emergency equipment for flight over sparsely settled areas described in Air Navigation Order Series V No. 12.

### *SAFETY ACTION*

The Board has no recommendations to issue at this time.

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## GOOSE BAY AIR SERVICES LIMITED
## CESSNA A185F SKYWAGON C-GGVZ
## HOPEDALE, LABRADOR, NEWFOUNDLAND
## 11 MARCH 1986

BRIEF NUMBER: 86-A60006 (Accident)
LOCAL TIME: 1055 AST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,352 | 365 |
| LAST 90 DAYS | 18 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

### *REPORTED CIRCUMSTANCES:*

The ski-equipped aircraft was on a charter flight to Hopedale where the pilot intended to land on the snow-covered ice surface of the harbour. The pilot circled the area once then landed. After touchdown, the skis struck a snow ridge, and the right ski was torn off. The aircraft came to rest upright with the right wing tip touching the surface.

The normal landing area on the harbour is designated by an alignment of empty fuel drums. The pilot, who was not familiar with winter operations at Hopedale, used the drums for visual reference but landed in another area where the snow surface was rough, with several snow ridges. The ridges were not apparent because of the light conditions.

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PICKLE LAKE AIR SERVICES
DE HAVILLAND DHC-3 C-FBEW
PICKLE LAKE, ONTARIO 48 mi NW
17 MARCH 1986

REPORT NUMBER: 86-C60018 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1340 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 15,000 | 2,000 |
| LAST 90 DAYS | 300 | 300 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

***HISTORY OF THE FLIGHT:***

On arrival at the remote lake, the pilot carried out a precautionary approach to assess the surface condition. With climb-flap set and the skis partially retracted, the aircraft was flown just over the ice, so that the wheels left imprints in the snow cover. The pilot carried out an overshoot, during which he noted water in the tire tracks, deemed that area unsuitable for landing, and circled left for a second pass on another section of the lake. The same procedure was followed, but, after the throttle was advanced for the overshoot, the port wing folded upward, and the aircraft rolled over.

One passenger, who was sitting on the cargo and was not restrained by a seat-belt, received minor injuries. All the other occupants were properly restrained and were uninjured.

***PERTINENT INFORMATION:***

Witnesses on site within hours of the occurrence noted that there was a large pile of slush near the end of the first set of tracks. Along the second set of tire tracks, the starboard ski left a regular imprint in the snow, but the port ski seemed to have touched down sporadically. About 30 feet beyond the end of the tire tracks, the port ski left an imprint which indicated it had begun to slew outward. This ski was found separate from the main wreckage. The port wing strut was found severed, and the wing was lying underneath the fuselage.

Both sides of the forward section of the port ski exhibited pronounced upward bending. The aft end of the ski was bent downward roughly 90 degrees. The outboard metal protector strip had wrenched free from its forward attachments and was folded back. The ski attachment structure had separated from the landing gear axle, and the shock absorber was deformed; all bending was outward and backward, while all breaks were consistent with overload failure. The rear check cable was found in two pieces, one piece still connected to the fuselage and draped over the stump of the wing strut. The forward ski cable attachment fitting was broken.

The port wing strut was severed at the point where the ski, swinging on the cables, would have reached it. Tiny paint flecks adhering to the outboard side of the ski matched the paint on the wing strut. Pieces of the wing root attachment structure remained bolted to the fuselage fittings.

The ski assembly had appeared to be in good condition before take-off from Pickle Lake, the last departure point.

***ANALYSIS:***

At some point during the surface condition checks, probably just before lift-off from the first pass, the port ski struck a ridge of ice. On or shortly after commencement of the second pass, the damaged ski attachments failed in overload. When the pilot applied power for the overshoot and the aircraft began to lift off, the port ski moved out under the wheel. Swinging on the cables, it travelled upward and rearward, severing the wing strut before its aft end struck the ice, causing the cables to break free. The unrestrained port wing folded upward, and the aircraft rolled to the left.

***FINDINGS:***

**Cause Related:**
1. During a surface condition check on a frozen lake, the aircraft's port ski struck a ridge of ice, damaging the ski and its attachments.

2. The ski attachments failed in overload during a subsequent surface conditions check.

3. The ski, which was connected by check cables, swung outward and severed the wing strut.

4. The unrestrained wing folded upward, and the aircraft rolled over.

**Other:**
1. A passenger, who did not have use of an aircraft seat or seat-belt, received minor injuries.

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## HUGHES AIR (ALBERTA) LIMITED
## PIPER PA-31 NAVAJO C-GITW
## BASNETT AIR STRIP, ALBERTA
## 20 MARCH 1986

REPORT NUMBER: 86-W60008 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1130 MST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,320 | 600 |
| LAST 90 DAYS | 260 | 220 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

***SUMMARY REPORT:***

The charter flight with a pilot and five passengers on board was en route to a remote drilling site. On arrival in the area, the pilot was informed, by UNICOM, of departing helicopter traffic. The charter pilot saw a helicopter in the vicinity of an airstrip and accepted this airstrip as his intended destination. He carried out a normal circuit and landing. During the landing roll, deceleration was more rapid than expected, and the pilot realized that he had landed on the wrong strip. He applied full power in an attempt to overshoot, but the nose gear failed before he was able to lift off. None of the occupants were injured.

The runway had not been maintained and was covered with 18 inches of soft, wet snow.

The pilot was new to the area but had been briefed that his destination strip was adjacent to a refinery and that a second, unused strip, orientated in the same direction, was located within five miles.

The rapid deceleration and the failure of the nose gear was the result of excessive drag caused by the deep soft snow.

***FINDINGS:***

**Cause Related:**
1. The pilot landed in deep snow on the wrong airstrip.

**Other:**
-Nil-

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## QUEBECAIR
## BOEING 737-200A C-GZBH
## VAL D'OR AIRPORT, QUEBEC
## 10 APRIL 1986

REPORT NUMBER: 86-Q64034 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2016 EDT
OPERATION: Scheduled Domestic
DAMAGE: Minor
PILOT LICENCE: Airline Transport

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 16,500 | 3,000 | 9,700 | 600 |
| LAST 90 DAYS | 150 | 150 | 180 | 180 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 5 |
| PASSENGERS | - | - | 73 |

***HISTORY OF THE FLIGHT:***

With the co-pilot at the controls, the crew flew an instrument approach in instrument meteorological conditions to land on runway 36. The captain, who was seated on the left, reported sighting the ground at 1,500 feet above ground level (agl) and the runway approach lights at one mile. During the landing, the aircraft was not kept within the confines of the snow-covered runway. After touchdown, the captain took control of the aircraft, realigned it with the runway and completed the landing. The captain requested that the tower controller have the runway lights on the right side of runway 36 inspected, as he had come close to the extreme right of the runway on landing and had heard a thump. The aircraft later departed as scheduled.

***PERTINENT INFORMATION:***

The weather information obtained en route by the crew indicated a precipitation ceiling of 800 feet agl, and a visibility of three quarters of a mile in snow showers. The wind was forecast to be 320 to 340 degrees at 15 gusting to 20 knots. The crew reported the wind on landing as forecast. Following the arrival of the aircraft, a special weather observation, taken at about two miles from the threshold of the runway in use, recorded a precipitation ceiling of 500 feet agl and one-half mile visibility in snow showers.

A runway surface condition report at 2000 EDT revealed that the runway was covered by one eighth of

an inch of snow. All runway and approach lights and all radio aids were functioning properly; the lights were set at maximum strength.

The first visible ground marks indicate that the left tire of the left main gear first touched down slightly forward of a runway light located five feet to the right side of runway 36. Ground marks were measured at 2,020 feet passed the threshold. The left vortex dissipator, located under the left engine, scraped the runway surface at 2,250 feet from the threshold, indicating that the aircraft was in left wing down attitude at touchdown. The runway lights, located 2,200 and 2,400 feet respectively, were broken by the left main gear tires. The right main gear tires first contacted the ground 2,500 feet from the threshold, 16 feet 10 inches from the right edge of runway 36 - another indication that the aircraft was in a left-wing-down attitude at touchdown. The right tires left pronounced marks on the ground and the marks are consistent with the aircraft assuming a heading of 20 degrees to the left into wind. The first visible ground marks of the left main gear tires on the runway were 2,600 feet from the threshold.

An experienced employee inspected the runway immediately after the pilot's request and discovered two broken runway lights. He also observed that the first visible marks indicating that the aircraft was completely on the surface of the runway were 2,700 feet from the threshold.

By the time it became apparent that this incident should be investigated, the aircraft had flown in excess of the storage capacity of the cockpit voice recorder (CRV). The CVR therefore did not provide any information relative to the incident.

### *ANALYSIS:*

At decision height, the crew decided that there was sufficient visual reference to land the aircraft safely. The wind at the time would not normally pose a problem in executing a safe landing. However, during the landing, the pilot flying did not keep the aircraft within the confines of the snow-covered runway, and, as a result, two runway edge lights were broken when the captain brought the aircraft back onto the runway. The snow which covered the runway and the ground may have affected the crew's perception of the runway environment.

### *FINDINGS:*

**Cause Related:**
1. During the landing, the crew did not keep the aircraft within the confines of the snow-covered runway, and, as a result, two runway edge lights were broken when the aircraft rolled from the unpaved ground to the runway.

**Other:**
- Nil -

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## SNOW BIRD AVIATION
## PIPER PA-34 SENECA C-GJWZ
## STONY RAPIDS, SASKATCHEWAN
## 16 APRIL 1986

**BRIEF NUMBER:** 86-C64013 (Incident)
**LOCAL TIME:** 1320 CST
**OPERATION:** Charter
**DAMAGE:** Substantial
**PILOT LICENCE:** Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,870 | 310 |
| LAST 90 DAYS | 285 | 266 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

### *REPORTED CIRCUMSTANCES:*

The aircraft was departing from runway 23 on a visual flight rules (VFR) flight from Stony Rapids, Saskatchewan to Uranium City, Saskatchewan. Eight hundred feet from the threshold during the take-off run, the aircraft's nose gear collapsed and the aircraft slid to a stop on the left side of the runway in an upright nose down attitude.

The nose gear actuator had an incorrect "O" ring installed at the piston. Wear on the "O" ring caused it to fail which allowed hydraulic fluid to by-pass the piston. This allowed the nose gear downlock to disengage, and the nose gear collapsed.

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**CESSNA 180E C-FYRG**
**SIM LAKE, ONTARIO**
**15 MAY 1986**

**REPORT NUMBER:** 86-O/60035 (Accident)
**INFORMATION SOURCE:** Field Investigation
**LOCAL TIME:** 1430 EDT
**OPERATION:** Private Company Business
**DAMAGE:** Substantial
**PILOT LICENCE:** Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,618 | 425 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

***HISTORY OF THE FLIGHT:***

At 1415 eastern daylight time (EDT) on 15 May 1986, the pilot and passenger departed Kagianagami Lake to fly to a fishing camp on Sim Lake, 10 miles northwest. The aircraft did not return when expected, and at 1615 EDT on 16 May, the Trenton Rescue Coordination Centre (RCC) was advised of the missing aircraft. About two and one-half hours later that day, a local pilot spotted the aircraft in the bush near Sim Lake. The pilot and passenger were fatally injured.

***PERTINENT INFORMATION:***

Witnesses reported the weather as clear throughout the area during the day of 15 May, and the local weather reports confirmed this observation.

Autopsies were conducted on both the pilot and the passenger. There was no evidence that incapacitation or physiological problems affected the pilot's performance.

Seat-belts were provided for both the pilot and the passenger. Only the pilot, who was in the left seat, was wearing a seat-belt when the aircraft was discovered.

The flight from Kagianagami Lake to Sim Lake is approximately 15 minutes. When the wreckage was examined, the aircraft clock was found to have stopped at 1430:40 EDT, which was 15 minutes after the aircraft departed Kagianagami Lake. The pilot's widow confirmed that the clock had been serviceable prior to the accident.

The aircraft was equipped with an emergency locator transmitter (ELT). When the ELT was recovered from the wreckage, it was found that the antenna had been severed by impact damage; no ELT transmission was received by RCC.

The aircraft engine was examined at the scene; no mechanical malfunctions were found. The engine had been developing power at impact. The continuity of the flight controls was checked and showed no indications of pre-impact failure. The flap position indicator inside the cockpit on the floor indicated the full-flap position (40 degrees). The left flap was measured to be 38 degrees, the right flap was too badly damaged to be measured accurately. The weight and centre of gravity were within the prescribed limits.

Ground markings indicate that the aircraft struck the ground at a steep angle. There was a large indentation on the leading edge of the port wing, about one and one-half feet inboard of the tip. The bush surrounding the accident site was covered with dead, standing trees, 60 to 80 feet high. One tree approximately 90 feet behind the ground impact marks had been broken off about 35 feet above the ground. Several splinters of wood and paint found along the wreckage trail indicated that the aircraft had struck this tree.

The flight path of the aircraft prior to the impact was not determined.

***ANALYSIS:***

Damage to the leading edge of the port wing indicated that the aircraft struck a tree near the wing tip. However, it remains undetermined as to whether this impact was the initial cause of the accident sequence or a contributing factor.

Examination of the aircraft wreckage did not reveal any evidence of failure of the engine or flight control system prior to impact that could have contributed to the accident.

The following laboratory reports were completed: LP 114/86 - Instruments Analysis; LP 115/86 - Lightbulb Analysis; LP 116/86 - Pushrod Examination; LP 141/86 - ELT Analysis; LP 51/87 - Propeller Governor.

***FINDINGS:***

**Cause Related:**
1. The contributing factors and cause of this accident could not be determined.

**Other:**
-Nil-

BEARSKIN LAKE AIR SERVICES LTD.
CESSNA 180 SKYWAGON C-GQVR
WUNNUMMIN LAKE, ONTARIO
29 MAY 1986

BRIEF NUMBER: 86-C60041 (Accident)
LOCAL TIME: 1530 CDT
OPERATION: Charter
DAMAGE: Nil
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,400 | 600 |
| LAST 90 DAYS | 100 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |
| OTHER | - | 1 | 3 |

***REPORTED CIRCUMSTANCES:***

The pilot of the float-equipped aircraft had commenced his take-off run, when an outboard power boat rounded a point of land and proceeded on an intercepting course with the accelerating aircraft. A passenger in the aircraft noticed the boat approaching from the right, slightly to the rear, and shouted a warning to the pilot who immediately shut down the engine. The boat operator was unable to avoid the aircraft, and the boat collided with the right pontoon. The boat operator was seriously injured when the boat struck a landing gear strut, and he was thrown into the water.

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GULAIR LTD
CESSNA T207A C-GMHC
GUNISAO LAKE, MANITOBA
30 MAY 1986

BRIEF NUMBER: 86-C60042 (Accident)
LOCAL TIME: 1100 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 543 | 308 |
| LAST 90 DAYS | 51 | 43 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***REPORTED CIRCUMSTANCES:***

This was a charter flight to a privately operated 3,300-foot strip. Shortly after touchdown, the aircraft swung to the right, ran off the runway, and collided with rocks. No one was injured.

The weather was clear, and there was a 90-degree cross-wind from the right at speeds gusting to 30 knots.

The first few hundred feet of the runway used were sheltered on the right by a large clump of bushes. The aircraft touched down in this area, and directional control was lost when it rolled beyond the sheltered area and encountered the full force of the cross-wind.

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SHUSWAP FLIGHT CENTRE
DE HAVILLAND DHC-2 BEAVER C-FGCY
KELOWNA, BRITISH COLUMBIA
31 MAY 1986

REPORT NUMBER: 86-P60022 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1950 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,200 | 80 |
| LAST 90 DAYS | 150 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 7 |

***HISTORY OF THE FLIGHT:***

The unscheduled charter flight departed Salmon Arm during the late afternoon to pick up seven passengers in Nelson. The flight was continued to Kelowna where, during the landing roll, directional control was lost. The aircraft ground looped to the left and skidded sideways off the left side of the runway. The right main gear and tail wheel dug into soft ground, and the aircraft bounced. During the skid and bounce, the tail wheel and fuselage were twisted, and the right main gear attachment bolts were bent. Neither the pilot nor the passengers were injured.

***PERTINENT INFORMATION:***

At about 20 mph during the landing roll, the pilot initiated a left turn to exit the runway. When the pilot noticed an increasing rate of turn, he attempted to control the aircraft with brakes. The swing could not be stopped, and the aircraft ground looped.

The pilot reported that he was preoccupied and tired because he had not slept well the previous night.

The weather at the time of the occurrence was clear, and the wind was calm.

An engineer who witnessed the occurrence subsequently checked the aircraft's brakes and found them to be free and in a serviceable condition.

The aircraft's weight and balance exceeded allowable limits on take-off out of Nelson. The landing weight in Kelowna was within limits; however, the centre of gravity (C of G) remained aft of the allowable limit.

***ANALYSIS:***

The left turn initiated by the pilot was allowed to continue unchecked because the pilot was preoccupied and tired. When the pilot noticed the continuing left swing, he was unable to correct it. The swing was further aggravated by the aft C of G.

***FINDINGS:***

**Cause Related:**
1. The pilot lost directional control of the aircraft because he was preoccupied and tired.

2. The C of G was aft of the allowable limit on landing.

**Other:**
1. The weight and C of G limits were exceeded on take-off.

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SPRINGDALE AVIATION INC.
PIPER PA-28-150 SUPERCUB C-FKST
UNNAMED LAKE, NEWFOUNDLAND
20 JUNE 1986

REPORT NUMBER: 86-A60020 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1730 NDT
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 950 | 500 |
| LAST 90 DAYS | 75 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***HISTORY OF THE FLIGHT:***

The float-equipped aircraft was picking up two fishermen from a lake which was approximately 1,000 feet long. After take-off with one passenger on board, a partial loss of engine power (Lycoming 0-320-A28) occurred, and the pilot decided to land immediately. After landing, he realized he would be unable to stop before striking the shoreline, so he turned the aircraft to the left. The nose of the floats dug in, and the aircraft nosed over and floated, supported by the floats. The pilot and the passenger escaped from the aircraft, removed some clothing, and swam to shore.

Search and Rescue were notified by the RCMP of the missing aircraft on the afternoon of 21 June 1986. A helicopter which was diverted to the search area found the aircraft and the survivors.

***PERTINENT INFORMATION:***

The engine was examined and a quantity of oil was found in the points compartment of the left magneto. It was determined that the seal on the magneto shaft where the shaft enters the points compartment was leaking, thus allowing lubricating oil to enter.

The oil seal was examined, and it was determined that the leak was caused by wear. Further examination of the magneto by an engine overhaul agency revealed that the coil was cracked.

***ANALYSIS:***

The oil that contaminated the points compartment of the left magneto inhibited the points from firing properly; as a result, the engine lost partial power. A short circuit could also have occurred in the cracked coil because of the higher resistance at the contaminated points.

***FINDINGS:***

**Cause Related:**
1. The points compartment in the left magneto was contaminated by oil which caused the engine to lose power.

2. The stopping distance available was not sufficient to perform a successful rejected take-off.

**Other:**
1. The coil in the left magneto was cracked.

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AQUILA AIR LIMITED
CESSNA 172M C-GHPQ
NORMAN POINT, BRITISH COLUMBIA
30 JUNE 1986

BRIEF NUMBER: 86-P60033 (Accident)
LOCAL TIME: 1645 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 305 | 135 |
| LAST 90 DAYS | 50 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was executing a full-flap approach to a private grass airstrip. The aircraft was still airborne as it crossed the intended touchdown point. The pilot raised the flaps; the aircraft settled onto the grass, rolled over a hump, and became airborne again. When it touched down the second time, the pilot applied take-off power but was unable to avoid bushes at the end of the runway. The aircraft went through the bushes, over a 60- to 70-foot cliff, and crashed into shallow water below.

The grass runway was wet because of a recent rain shower. Wind conditions were variable and gusty.

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MCKINLEY AIR TRANSPORT INC
BEECH B-90 KING AIR N638D
PELEE ISLAND, ONTARIO
03 JULY 1986

REPORT NUMBER: 86-O/60903 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0930 EDT
OPERATION: International Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 14,000 | 1,250 |
| LAST 90 DAYS | 70 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 6 |

***HISTORY OF THE FLIGHT:***

The twin-engine aircraft was on a charter flight from Akron, Ohio to Pelee Island, Ontario. The pilot flew a long, power-on, straight-in visual approach to runway 27 at Pelee Island, and, during the round-out, as the power was reduced, the landing gear horn sounded. The aircraft with its gear retracted touched down 500 feet from the threshold, veered to the right, and slid off the runway approximately 1,000 feet from the threshold. The aircraft then struck a ditch approximately two feet deep located 75 feet off the side of the runway and came to rest 25 feet beyond the ditch.

***PERTINENT INFORMATION:***

The weather at the time of the accident was clear, and wind was from the northwest at seven knots.

The pilot could not recall whether he had selected the gear down or whether he had checked the gear indicator lights prior to landing.

Examination of the aircraft revealed that the landing gear was not down on landing. A witness to the final stages of the approach and the landing confirmed that the aircraft landing gear was not down for the approach or landing.

The gear horn warning system in this type of aircraft is actuated when the throttle is reduced to a certain position with the gear not down and locked. This system was checked and found to be functioning normally. The

pilot flew a shallow approach at a higher than normal power setting to keep the engines spooled up to ensure that reverse thrust would be immediately available for landing on the relatively short runway.

During the final stages of the approach, the pilot responded to questions about the aircraft operation which were posed by a passenger who was occupying the right front seat.

***ANALYSIS:***

The pilot did not select the gear down prior to landing, and, as a result, the aircraft was landed wheels-up. The higher than normal power setting prevented the gear warning horn from sounding until the power was reduced on the flare. When the horn did sound, the pilot did not have time to react and overshoot. The pilot was distracted from his primary task of piloting the aircraft during a critical phase of flight by questions from the passenger.

***FINDINGS:***

**Cause Related:**
1. The pilot did not complete a pre-landing check.

2. The pilot did not select the gear before landing, and, as a result, the aircraft landed wheels-up and slid off the side of the runway.

3. After the aircraft slid off the runway, it struck a ditch, causing substantial damage to the aircraft.

**Other:**
1. The pilot was distracted on final approach by a conversation with a passenger who was occupying the right front seat.

WESTWIND AVIATION INC.
BEECH 58 BARON C-GLAC
THE PAS, MANITOBA
04 JULY 1986

BRIEF NUMBER: 86-C60058 (Accident)
LOCAL TIME: 1452 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,740 | 450 |
| LAST 90 DAYS | 155 | 95 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

***REPORTED CIRCUMSTANCES:***

Following a normal approach, the pilot landed the aircraft on the right wheel first because of a cross-wind from the right. As the speed reduced, the left wing dropped until it contacted the runway. The left landing gear had not extended.

Once he had selected the landing gear down, the pilot confirmed that the main landing gear light was green and that the nosewheel was down. The light indicates the position of the landing gear gearbox, not the position of the landing gear; therefore, the pilot was not aware that the left gear had not extended. There was considerable mud and gravel found in the uplock area, which prevented the uplock from disengaging when the landing gear was selected down.

## DE HAVILLAND DHC-2 BEAVER C-FMAW
## SALTSPRING ISLAND, BRITISH COLUMBIA
## 21 JULY 1986

REPORT NUMBER: 86-P60039 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1638 PDT
OPERATION: Private Company Business
DAMAGE: None
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,340 | 718 |
| LAST 90 DAYS | 110 | 110 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | 1 | 1 |

***SUMMARY REPORT:***

The pilot with two passengers on board flew the float-equipped aircraft from Vancouver, British Columbia to Scott Point on Saltspring Island, British Columbia. While the aircraft was being manoeuvred to the dock, one of the passengers sustained serious injuries when he was struck by the propeller and thrown into the water.

The wind at Scott Point was from the east, gusting from 8 to 16 knots. The pilot therefore had to approach the dock at a 45-degree angle and moor with the dock on the right side of the aircraft. As soon as the pilot decided the aircraft had enough speed to reach the dock, he shut down the engine.

The right front-seat passenger asked if he could help the pilot with the docking. The pilot accepted his offer but cautioned the passenger to stay clear of the propeller. When the pilot and passenger got out onto the right float, the pilot realized that the aircraft did not have enough speed to reach the dock and that it was in danger of being blown backwards into a sailboat. After warning the passenger and ensuring that he was standing behind the wing strut, the pilot got back into the aircraft and re-started the engine.

Following a short burst of power to get the aircraft moving forward, the pilot shut down the engine again and got out onto the right float. As he did so, he saw the passenger step forward into the propeller, which was just coming to a stop, and fall into the water.

The passenger later said that, as he was a boater, it was a natural reaction for him to step forward to fend the aircraft float from the dock. He had been a passenger on a long flight the previous night and considered that lack of sleep may have impaired his judgement.

A difficult docking, in gusting wind conditions, led the pilot to accept the passenger's help. The passenger's automatic reaction to prevent the aircraft from colliding with the dock caused him to step into the turning propeller although he had been cautioned by the pilot to stay clear of it.

***FINDINGS:***

**Cause Related:**
1. Gusting wind conditions made it difficult for the pilot to dock the aircraft.

2. The passenger was helping the pilot to dock the aircraft.

3. The passenger's automatic reaction to prevent the aircraft's float from hitting the dock caused him to step into the turning propeller.

**Other:**
1. The passenger was tired following an all-night flight.

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## AKLAK AIR LIMITED
## CESSNA 185F C-GAWI
## SITIDGE LAKE, NORTHWEST TERRITORIES
## 23 JULY 1986

REPORT NUMBER: 86-W60035 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2130 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,400 | 35 |
| LAST 90 DAYS | 200 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

***SUMMARY REPORT:***

The pilot of the float-equipped aircraft landed south of an island in an area sheltered from the strong northeast wind. Three of the five passengers waiting to be taken back to Inuvik were picked up, and the aircraft was taxied to the west of the island into an unsheltered area of waves two feet high, for a take-off to the northwest. On the take-off run, the aircraft bounced into the air in a nose-high attitude while at a low airspeed. The aircraft

drifted to the left in the strong cross-wind, and the left wing dropped. The left float contacted the water, and the aircraft was pulled into the air in a nose-high attitude. One of the two passengers remaining on the island indicated that the aircraft then appeared to begin a turn to the left. The left wing and float struck the water. Both floats broke free, and the aircraft sank.

The passenger occupying the right front seat broke the right window, allowing water to fill the cabin sufficiently to permit the door to be opened. All four on board evacuated the aircraft safely and climbed onto the floats to await rescue. The two passengers remaining on the island, awaiting the next flight, were able to paddle out and rescue those waiting on the floats.

The recommended take-off procedure requires that the run begin with the control column held fully back. At the point where the bow wave leaving the float moves aft of the wing strut, the control column should be moved forward slowly to permit the aircraft to assume a planing attitude. The aircraft will then accelerate to take-off speed and lift off smoothly. For a cross-wind take-off, it is recommended that the take-off run start with wing flaps up and water rudders extended for better directional control. Flaps should be extended to 20 degrees, and the water rudders should be retracted when the aircraft is on the step. The demonstrated cross-wind component for adequate control of the aircraft during take-off and landing is 15 knots.

The sheltered area south of the island was suitable for the take-off attempt. The take-off path selected by the pilot was in open water west of the island, 90 degrees to the prevailing 10- to 15-knot wind. The recommended cross-wind technique was not used by the pilot.

The pilot was relatively inexperienced on floats and on the aircraft type. Before leaving home base, a company pilot had suggested that she stay in the shelter of the island to avoid the rough water that covered the rest of the lake.

The pilot's take-off briefing should include the location and use of life-jackets. Life-jackets were available but were not mentioned in the take-off briefing. The passengers did not know there were life-jackets on board. None were used by the pilot or the passengers while awaiting rescue.

The pilot's choice of take-off direction and non-compliance with the recommended take-off technique resulted in the loss of control.

***FINDINGS:***

**Cause-Related:**

1. The pilot attempted a take-off in wind and water conditions beyond her level of experience. The recommended take-off techniques were not followed, and, as a result, a loss of control occurred.

**Other:**

1. The pilot omitted essential information regarding safety equipment in the pre-take-off briefing, and none of the life-jackets on board the aircraft was used.

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## SQUAMISH AIR SERVICES
## DE HAVILLAND DHC2 C-FQQF
## PORT ALBERNI, BRITISH COLUMBIA 5 mi S
## 11 AUGUST 1986

REPORT NUMBER: 86-P60044 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1330 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,158 | 550 |
| LAST 90 DAYS | 120 | 120 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft was departing from the Alberni Canal for a flight to Jervis Inlet, British Columbia. The purpose of the flight was to transport salmon fingerlings to a fish farm located on Vanguard Bay. As the aircraft was lifting off, the right wing rose, and the left wing dug into the water. The aircraft cartwheeled, coming to rest in an inverted position, and sank to the floats. Both occupants were able to escape from the aircraft safely.

At the time of the accident, the ceiling and visibility were unlimited, and the wind was from the south at 15 gusting to 20 mph.

The take-off was to the southeast, in an area protected from the wind by a point of land. As the aircraft came up on the step, it emerged from the sheltered area and encountered the wind from the right quarter. A gust of wind lifted the right wing up, causing the left wing to

dig into the water. The pilot was unable to compensate for the sudden change of wind speed and direction.

*FINDINGS:*

**Cause Related:**
1. The pilot was unable to compensate for the sudden change of wind speed and direction as the aircraft emerged from behind a point of land.

2. The wind lifted the right wing up and caused the left wing tip to strike the water.

**Other:**
-Nil-

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LAC SEUL AIRWAYS LTD.
DE HAVILLAND DHC-2 C-GLSA
SIOUX LOOKOUT, ONTARIO 40 mi NW
12 AUGUST 1986

REPORT NUMBER: 86-C60078 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1400 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,500 | 300 |
| LAST 90 DAYS | 250 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

*HISTORY OF THE FLIGHT:*

The pilot was performing his first flight with the contracting customers. The landing on the narrow river was uneventful, and, later that day, the pilot attempted to take off into the current with a quartering tail wind from the left. Directional control was not maintained during the take-off run, and the aircraft veered to the left towards the shoreline. The pilot shut down the engine, and the aircraft struck a mud shoal, damaging the floats and the tail section.

*PERTINENT INFORMATION:*

The pilot said that he had never operated in such a confined area before although another company pilot had previously operated there. An unconfined lake was available close by. The landing area selected by the pilot was in proximity to a dam where the passengers were to do some work. The current was strong, and the water level was low, thus exposing numerous mud shoals along the narrow river. The pilot decided to take off into current with a 12- to 18-knot quartering tail wind from the left. Had the take-off been attempted into wind, the strong current would have delayed the take-off and made it difficult to clear some high posts located over the dam. The pilot also decided to take off downwind since the shape of the river was more favourable in that direction.

*ANALYSIS:*

Although a suitable lake was available close by, the pilot attempted to operate in a confined area. Because of the quartering tail wind, the pilot could not maintain directional control of the aircraft during the take-off.

*FINDINGS:*

**Cause Related:**
1. While attempting to take off from a confined area with a quartering tail wind, the pilot lost directional control of the aircraft.

**Other:**
-Nil-

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AIR NORTH CHARTER & TRAINING LTD.
DE HAVILLAND DHC-3 OTTER C-GMCW
MAYO, YUKON 80 mi NNW
13 AUGUST 1986

BRIEF NUMBER: 86-W60046 (Accident)
LOCAL TIME: 1200 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,800 | 800 |
| LAST 90 DAYS | 300 | 300 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

***REPORTED CIRCUMSTANCES:***

The pilot was flying the float-equipped aircraft through a narrow pass with visibility occasionally reduced by rain. The pilot entered the pass with the impression that he could see the top and would have no difficulty flying through the pass. However, after entering the pass, he realized he could not fly over the rising terrain, nor turn the aircraft around. He landed straight ahead on the rising slope.

## OSNABURGH AIRWAYS
## CESSNA A185F SKYWAGON C-GIRX
## WUNNUMIN LAKE, ONTARIO
## 15 AUGUST 1986

BRIEF NUMBER: 86-C60079 (Accident)
LOCAL TIME: 1810 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

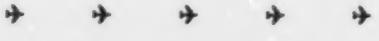
| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 293 | 57 |
| LAST 90 DAYS | 57 | 57 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***REPORTED CIRCUMSTANCES:***

The pilot taxied the float-equipped aircraft to a point off-shore and began his take-off run toward the shoreline. After lift-off, the pilot levelled the aircraft to allow the airspeed to increase. He was in the process of setting climb power and retracting the flaps when the right float contacted the water. The pilot lifted the aircraft clear but, after a short distance, the right float again struck the water. The float dug in, the right wing tip submerged, and the aircraft came to rest in an inverted position.

The take-off run was toward the south; the wind was gusting from the south-southwest at 10 to 15 mph.



## DYMOND LAKE AIR SERVICES LTD.
## CESSNA U206F STATIONAIR C-GDLO
## MAGUSE LAKE, NORTHWEST TERRITORIES
## 19 AUGUST 1986

BRIEF NUMBER: 86-C60085 (Accident)
LOCAL TIME: 1615 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 962 | 244 |
| LAST 90 DAYS | 250 | 244 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

***REPORTED CIRCUMSTANCES:***

The pilot of the float-equipped aircraft began the take-off run for a short flight to a nearby lake. The wind was strong, and the water was very rough with waves two and a half to three feet high. After cresting a wave, the aircraft dropped into a trough. The left float and left wing dug into the water, and the aircraft overturned.

## NORTH CARIBOO FLYING SERVICES LTD.
## BRITTEN NORMAN BN-2A ISLANDER C-FYZT
## FORT NELSON, BRITISH COLUMBIA 66 mi S
## 26 AUGUST 1986

REPORT NUMBER: 86-W60051 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1630 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10,000 | 150 |
| LAST 90 DAYS | 84 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

***HISTORY OF THE FLIGHT:***

The pilot was taking off from a 1,680-foot grass strip at an elevation of 2,550 feet above sea level in the mountains of northeastern British Columbia. After a run of

about 1,000 feet, and as it neared lift-off speed, the aircraft entered a soft area, and acceleration ceased for several hundred feet. The aircraft became airborne within 100 feet of the end of the runway. A row of trees, 30 feet high, crossed the departure path 450 feet beyond the end of the strip. The aircraft was only 20 feet above the ground when it flew through the trees, emerging on the other side with considerable damage to the fuselage, wing leading edges, and the horizontal stabilizer. The pilot kept the aircraft airborne, completed a circuit, and landed back on the runway without further incident. One passenger suffered facial lacerations when a section of tree penetrated the cabin window.

***PERTINENT INFORMATION:***

The aircraft weight and balance were within the prescribed limits, and both engines were capable of producing their rated power. The temperature was 24 degrees Celsius, the density altitude was 4,000 feet, and the wind was calm. The surface of the grass strip was rough, and it was soft and wet in some areas.

During the last three and one-half years, the pilot had flown 150 hours on an Islander fitted with 300 horsepower engines. During the week prior to the accident, he had been flying a model with 260 horsepower engines.

***ANALYSIS:***

The relatively high density altitude, combined with the lower horsepower of the model being flown, reduced the take-off performance to less than what was expected by the pilot.

Take-off data tables indicate that the aircraft required a ground run of 750 feet when operating on a dry grass runway under the conditions of weight, temperature, and elevation that existed. The rough surface lengthened the take-off roll, and the soft wet area encountered during the take-off further reduced the take-off performance. When acceleration ceased about two thirds of the way down the runway, there was still time to reject the take-off, but the pilot chose to continue the take-off attempt. This decision was influenced by his previous experience on models with the more powerful engines.

***FINDINGS:***

**Cause Related:**

1. The pilot attempted a take-off from an airstrip that was marginally suitable.

2. The pilot did not reject the take-off attempt after the aircraft stopped accelerating on soft ground.

3. The aircraft became airborne at too low a speed to initiate a normal climb.

4. Most of the pilot's experience in the aircraft type was on a model with more powerful engines than the model being flown at the time of the accident.

**Other:**

-Nil-

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SPECTRUM AIRWAYS
CESSNA 152 C-GBWJ
BURLINGTON AIR PARK, ONTARIO
30 DECEMBER 1985

REPORT NUMBER: 85-O/50096 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1455 EST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 33 | 30 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

While on the landing roll of the fifth consecutive circuit, and while the pilot was selecting flaps up and carburetor heat cold, the aircraft suddenly started to veer left. The pilot applied rudder and brake but was not able to counter the left turn, and the aircraft left the runway, struck a snowbank, and nosed over.

***PERTINENT INFORMATION:***

The aircraft was landing on runway 32 which is 2,800 feet long and 75 feet wide. The runway surface was dry asphalt with ice patches on the right-hand side. The temperature was approximately zero degrees Celsius, and the wind was reported as varying from 250 to 270 degrees at 10 to 15 knots with gusts to 20 knots. The 90-degree cross-wind component could have been as high as 19 knots.

The Department of Transport Cross-Wind Landing Limitations - Light Aircraft Graph indicates that, as a general rule, this model of aircraft should not be landed when the cross-wind component exceeds nine knots.

Marks on the runway indicated that the left wheel skidded for approximately three yards. Two yards after the left skid mark stopped, the right wheel started to skid. Eight yards later, the nosewheel and left wheel started skidding. All the skid marks were 25 to 30 degrees from the runway heading towards the left edge of the runway. The aircraft travelled a total distance of 28 yards from the point where the left wheel initially started to skid until the right wheel left the runway. The aircraft then went through a two-foot-high snowbank and nosed over.

The instructor, who authorized the flight on the day of the accident, reported the wind to be 10 knots at 300 degrees at the time of authorization. He then went on a cross-country flight prior to the wind conditions changing.

The student had flown a total of three hours in the previous 90 days and had not practised cross-wind landings in the previous six weeks.

There was no indication of mechanical failure of the aircraft or of any of its systems prior to the occurrence.

*ANALYSIS:*

The skid marks were a result of applications of the brake to compensate for the gusty cross-wind. When the flight was authorized, the recommended cross-wind limitation was not exceeded, but, as the flight progressed, the winds changed direction and increased in speed, and the limitation was exceeded. As the student had flown only three hours in the last 90 days, he was not able to compensate for the excessive cross-wind conditions he encountered. Also it had been six weeks since he had practised cross-wind landings. These conditions exceeded the capability of the student pilot, and, as a result, he was unable to control the aircraft on landing.

*FINDINGS:*

**Cause Related:**

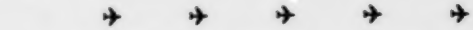
1. The cross-wind component was above the indicated limit, for this aircraft, and the pilot was not able to maintain directional control of the aircraft during the landing roll.

2. The student pilot continued to carry out circuits in increasing cross-wind.

3. The student pilot had flown only three hours in the previous 90 days and had not practised cross-wind landings in the previous six weeks.

**Other:**

-Nil-



## LAURENTIDE AVIATION
## GULFSTREAM GA-7 C-GMBW
## ST-NAZAIRE, QUÉBEC
## 23 JANUARY 1986

REPORT NUMBER: 86-Q60001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1415 EST
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:

| | CHECK PILOT | | PILOT AT CONTROLS | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 9,670 | 240 | 50 | 12 |
| LAST 90 DAYS | 190 | 0 | 35 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The purpose of the flight was to conduct a check-ride for a private pilot who wished to obtain a multi-engine rating. The Designated Flight Test Examiner (DFTE) occupied the right seat.

After approximately one hour of flight, the pilot, while carrying out a simulated left engine failure during an overshoot, lost control of the aircraft. The aircraft yawed to the left and pitched nose down. The pilot applied full throttle on both engines and full up elevator control. The yawing motion stopped, but the pilot was unable to prevent the aircraft from striking the trees below.

The terrain at the accident site was nearly level and covered with trees approximately 35 feet high, with some trees over 60 feet high. Both propellers showed damage indicative of intermediate engine power at impact.

The altitude at which the single engine overshoot exercise was initiated was approximately 1,000 feet above ground level.

Both pilots reported applying full up elevator controls prior to impact. They also reduced power subsequent to impact. Impact marks on the trees confirmed that the aircraft was recovering from the dive. The DFTE stated that, just prior to the loss of control, the airspeed was falling towards the minimum single engine control speed in the air (Vmca). Inspection of the flight control system provided no evidence of pre-impact failure. Impact marks on the elevator surfaces indicated full up elevator at the time of impact.

The aircraft yaw into the "dead" engine despite application of full opposite rudder, loss of elevator authority, and the fact that control was completely regained when full power was applied on both engines are indications that the aircraft airspeed fell below Vmca, shortly after the engine failure was simulated.

The evidence indicates that the DFTE simulated an engine failure at an altitude that was inappropriate and he permitted flight control inputs that resulted in loss of aircraft control prior to his intervention. Aircraft control was lost when the airspeed was allowed to decrease below Vmca.

A single engine overshoot is a demanding manoeuvre which requires a high level of skill, particularly at low altitude and low airspeed. Good airmanship dictates that critical exercises of this sort should be practiced at or above an altitude adequate to permit successful recovery of the aircraft in the event of an error in execution of this manoeuvre on the part of the pilot.

*FINDINGS:*

**Cause Related:**
1. Aircraft control was lost when the airspeed was allowed to decrease below Vmca.

2. For the engine failure exercise, the DFTE selected an altitude that was insufficient to permit recovery of the aircraft.

3. The DFTE did not adequately supervise the pilot and did not intervene prior to the loss of control.

**Other:**
- Nil -

*SAFETY ACTION:*

**Safety Action Taken:**
Transport Canada has amended its Flight Test Guide for Multi-Engine Class Rating Aeroplanes (Third Edition, June 1987) to reflect that "simulated engine failures will not be initiated below 2,000' AGL."

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## 100 MILE HOUSE FLYING CLUB
## CESSNA 172K C-FYHE
## PEMBERTON, BRITISH COLUMBIA
## 02 FEBRUARY 1986

REPORT NUMBER: 86-P60004 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1330 PST
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 132 | 132 |
| LAST 90 DAYS | 13 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*SUMMARY REPORT:*

After flying two circuits to visually inspect the airport, the pilot attempted a soft-field landing. During the landing roll on the snow-covered runway, the nosewheel separated, and the aircraft came to rest 90 degrees to the right of the runway heading.

The runway was covered with about five inches of snow. The pilot reported that there were no drifts and that there were tracks of other aircraft having used the runway. The airport has an asphalt runway 4,000 feet long by 100 feet wide, but, during the winter months, there is no runway maintenance. This information is contained in the Canada Flight Supplement. The pilot did not determine the condition of the runway before departing.

*FINDINGS:*

**Cause Related:**
1. Runway surface conditions at the destination airport were not established prior to departure.

2. The nosewheel separated from the aircraft after contacting the soft, snow-covered runway.

**Other:**
-Nil-

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REGINA FLYING CLUB
PIPER PA-30 TWIN COMANCHE CF-UBA
REGINA, SASKATCHEWAN
02 FEBRUARY 1986

REPORT NUMBER: 86-C60006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1614 CST
OPERATION: Flying Club Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 388 | 9 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The pilot of the twin-engine aircraft was practising circuits at Regina Airport. The aircraft had taken off on the third circuit when the pilot transmitted that the propeller was malfunctioning and that there was "under-revving." The control tower offered a choice of runways, and the pilot selected the nearest suitable one, stating that he would be making a 500-foot circuit. He was cleared to land on runway 08, and the clearance was acknowledged. No further transmissions were received.

The aircraft was then seen descending at a steep angle with the right wing down. It struck the ground short of, and in the opposite direction to, the landing runway.

***PERTINENT INFORMATION:***

The weight and balance of the aircraft were within the prescribed limits. There was a high overcast sky condition with excellent visibility. The winds were from the southeast at 10 knots, 40 degrees off the selected runway.

The pilot was an airport employee and was on duty operating snow-clearing equipment. In the course of these duties, he asked a flying club employee if the aircraft was available. When he was informed that it was, he stated that he would take it up for a few circuits. He was advised that the aircraft required fuel, and he remarked that he would do a visual check of the fuel tanks. He completed this action and stated that there would be enough for the intended flight.

The wreckage was confined to a small area. The landing gear and flaps were extended. Both engines were removed from the accident site and were dismantled. There was no evidence of pre-impact failure of the engines or engine components. There was no pre- or post-crash fire, nor was there evidence of fuel splash surrounding the site. The entire fuel system was examined and was found void of fuel except for 24 ounces located in the wing tip tanks. When the wreckage was lifted, less that two gallons of fuel drained from the wing root area. The left fuel selector was found positioned to the left main tank, and the right selector to the right auxiliary tank.

The aircraft fuel system incorporates four internal fuel cells and two wing tip tanks. The tip tanks are not normally filled unless required. The internal tanks hold 90 U.S. gallons, of which 84 gallons are usable. The internal tanks had been filled to capacity about two weeks prior to the flight, and the aircraft had flown 5.1 hours in the intervening period. Fuel consumption at low normal cruise is 15.2 U.S. gallons per hour. Twenty-seven minutes had lapsed from the time the aircraft commenced taxiing until the time of the accident; thus, the aircraft had flown nearly 5.6 hours without being refuelled.

The pilot who had flown the aircraft previously stated that the aircraft was serviceable and that he had parked it by the fuel tanks as it required refuelling.

***ANALYSIS:***

Using a fuel consumption figure of 15.2 U.S. gallons per hour, it was calculated that, prior to the accident flight, the aircraft had consumed 77.5 U.S. gallons of the 84 gallons available. The additional 27 minutes of operation would have used 6.8 gallons of fuel, for a combined total of 84.3 gallons. The amount of fuel used as well as the lack of fuel in the entire fuel system indicates that the engines lost power because of fuel exhaustion.

The angle of descent and confined wreckage area indicate that the aircraft was in a stalled condition at impact. During the turn toward the runway, the pilot lost control of the aircraft at too low an altitude to effect recovery.

***FINDINGS:***

**Cause Related:**
1. Both engines lost power because of fuel exhaustion.

2. The pilot lost control of the aircraft at too low an altitude to effect recovery.

**Other:**
-Nil-

AERO AVIATION CENTRE (1981) LTD.
PIPER PA-38 TOMAHAWK C-GPBR
LAMONT, ALBERTA
03 FEBRUARY 1986

REPORT NUMBER: 86-W60004 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1515 MST
OPERATION: Speciality Flying Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 48 | 48 |
| LAST 90 DAYS | 30 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

On the final leg of a solo cross-country flight, the student pilot contacted the tower at the Edmonton International Airport, requesting verification of his position. The aircraft was not transponder equipped, and the controller was unable to obtain a radar fix on the aircraft. As a result of a dialogue between the pilot and the advisory controller, the aircraft's position was fixed over the town of Mundare, Alberta. The pilot reported 20 to 25 minutes of fuel remaining. The controller issued a heading to the pilot that would take him to Vegreville, the closest airport, 12 miles to the southeast. The pilot set a course approximately 180 degrees from the assigned heading which took him to the town of Lamont. Over Lamont, the pilot searched unsuccessfully for the Vegreville Airport and, with about five minutes of fuel remaining, made a precautionary landing on a field. The aircraft sustained substantial damage during the roll-out on the rough surface of the field.

The student pilot, who had been flying for less than four months, was on his first solo flight out of visual range of Edmonton.

The pilot flew the route using the aircraft magnetic compass and visual flight rules (VFR) charts as the primary navigation aids. Examination of the pilot's flight log revealed that, prior to departure, he had highlighted the "true heading" column. The pilot flew these readings for all legs of the flight. The pilot's instructor had examined the flight log prior to the flight and determined that the calculations were correct. He did not notice that the student had highlighted this column.

Although the aircraft was within the area that was covered by the tower radar, no identification was made. A review of the air traffic services (ATS) tapes indicated that an effort had been made to get a radar fix on the aircraft for about one hour. Even when the location of the aircraft was established at Mundare, the tower controller was unable to fix the aircraft on radar at that position. According to ATS personnel, it is not uncommon for controllers to be unable to obtain a primary radar identification on a small aircraft in certain parts of the coverage area. There are three Transport Canada airports and one military airport in the Edmonton area. None have very high frequency (VHF) direction finding (DF) capability.

The directional gyro indicator was removed from the aircraft and bench tested for serviceability. The functional test report found a precession rate of -12 degrees per 10 minutes of operation on north and west headings. This precession rate far exceeds the tolerance.

Inspection of the area within one mile of the landing site revealed several flat roads and open stubble fields that were clear of fixed obstructions.

On the final leg of the flight, the pilot flew the true rather than magnetic heading for this leg because, during preparation for this flight, he incorrectly highlighted the true heading column of his flight log. This caused a 21-degree error which was compounded by excessive gyro precession. As a result, the aircraft quickly departed from the intended track. Because the pilot did not notice, through map reading, this departure from the intended track, he became lost.

Although the tower controller attempted to identify the aircraft on radar, the radar equipment in use at the airport is not suitable where primary identification of small aircraft is concerned.

As VHF DF equipment was not available, the controller could not direct the pilot to the Edmonton International Airport.

The aircraft sustained substantial damage during the precautionary landing because the pilot selected a rough field on which to land, instead of a flat road or an open stubble field, both of which were available in the vicinity.

***FINDINGS:***

**Cause Related:**

1. Because the pilot flew the route using true rather than magnetic headings, and because the directional gyro had an excessive precession, the aircraft departed from the intended track.

2. Because the pilot did not notice, through map reading, the departure from the intended track, he became lost.

3. ATS personnel were unable to electronically detect the position of the aircraft and follow its progress because the radar equipment available cannot detect certain small targets within its coverage area and because no VHF DF equipment is available in the Edmonton area.

4. The aircraft sustained substantial damage during the precautionary landing because a more suitable landing site was not selected.

**Other:**

-Nil-

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## CESSNA 150M C-GAJP
## BELOEIL, QUEBEC
## 09 FEBRUARY 1986

BRIEF NUMBER: 86-Q60004 (Accident)
LOCAL TIME: 1505 EST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 630 | 425 |
| LAST 90 DAYS | 70 | 70 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The student pilot, accompanied by a flight instructor, was practising touch-and-go landings. On the fourth take-off, when the aircraft was about 75 feet above ground level, the engine lost power. The instructor took over control of the aircraft, selected the carburettor heat control on HOT and completed the manufacturer's recommended checks. The temperature was minus five degrees Celsius, and the dew point was minus 13 degrees Celsius. The aircraft continued to lose altitude; the instructor increased the power, and the engine stopped. The pilot landed the aircraft in a field where it nosed over, about 800 feet from the end of the active runway. The front wheel and propeller of the aircraft were damaged. The two occupants exited uninjured.

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## LOYAL-AIR LIMITED
## PIPER PA-28-140 CHEROKEE C-GNWO
## BELLEVILLE AIRPORT, ONTARIO
## 16 FEBRUARY 1986

REPORT NUMBER: 86-O/60007 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1330 EST
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 800 | 500 |
| LAST 90 DAYS | 125 | 89 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The student pilot completed the pre-flight inspection of the aircraft, which included the sampling of fuel from the wing tanks and from the gascolator which is located forward of and on the lower left side of the firewall. The instructor then visually checked the drain valves, and, when he observed no leaks, both pilots boarded the aircraft. The aircraft had just returned from a dual training flight, and the fuel tanks were approximately one-half full. The instructor calculated that the fuel on board was sufficient for their flight and did not refuel the aircraft. While the aircraft was taxiing to the runway, the student, who was in the left seat, noticed a fuel odor in the cabin, but the instructor seated on the right did not.

The instructor flew the aircraft during the take-off. Shortly after lift-off, just as the instructor eased forward on the yoke to allow the aircraft to level off and increase airspeed, the engine lost power. As the nose was lowered, a surge of power occurred which was followed by a second power loss. The instructor attempted to land the aircraft on the runway remaining, but only the right main gear had touched down, before the aircraft neared the end of the runway. The instructor pulled back on the yoke and "ballooned" the aircraft over the boundary fence. The aircraft then touched down on a snow-covered, ploughed field and struck a deep furrow, tearing off the right main gear and the nose gear before sliding to a stop. Both occupants were uninjured.

*PERTINENT INFORMATION:*

The Belleville Airport has a single runway which is designated 08/26 and is 3,802 feet long and 150 feet wide. The runway surface was sod, covered with a thin layer of compact snow, and it had been ploughed its full length and width. A wire fence, approximately four feet in height, runs along the airport boundary about 20 feet beyond the end of runway 26.

Examination of the aircraft revealed a fuel stain on the bottom of the fuselage on the left side, running aft from the gascolator drain valve, and on the bottom of the left wing at the wing root. The instructor reported that, after the accident, he opened and closed the gascolator drain valve in an attempt to determine the position of the valve. The gascolator drain valve is located in a metal compartment at the left lower corner of the firewall. The drain valve itself is only visible by looking up from under the aircraft, through a circular hole cut in the lower cowling. Draining of the gascolator is done by reaching up through the cut out and pressing the spring loaded valve up.

The instructor reported that the electric fuel pumps had not been turned on, and the tank selector valve was in the OFF position when the fuel sample was taken from the gascolator. The PA-28-140 owner's manual specifies that to "drain the lines from the tanks, the tank selector valve must be switched to each tank in turn, with the electric pump on and the gascolator drain valve opened".

*ANALYSIS:*

In this fuel system design, where the fuel pump is located between the fuel tank and the carburettor, any leak in the system between the pump and the tank, at a point which is higher than the level of fuel in the tanks, will result in air being drawn through the leak, rather than fuel from the tank.

The presence of the fuel stains on the bottom of the fuselage and wing, originating at the gascolator drain, indicates that the drain valve on the gascolator was leaking during the taxiing manoeuvre and the take-off. This was further confirmed by the fact that the student smelled fuel while seated on the left side of the cockpit.

During the lift-off, the aircraft was rotated to a nose-high attitude, and, as a result, the fuel level in the tanks was lower than the level of the gascolator drain valve. Air was then able to enter through the leaking valve, a condition which prevented fuel from reaching the carburettor, and the engine stopped as a result of fuel starvation.

The procedure the student used for taking a fuel sample from the gascolator and adjoining fuel lines was not in compliance with the specified procedure.

As the tank selector valve was in the OFF position and only a small amount of fuel was in the gascolator, this fuel was removed when the student opened the drain valve. Since no fuel remained in the gascolator, fuel would not continue to run from the open valve; thus, an incorrectly seated valve would not have been detected by visual examination.

*FINDINGS:*

**Cause Related:**

1. The recommended procedure for sampling fuel was not followed.

2. The gascolator drain valve did not close fully after the fuel sample was taken, thus allowing air to enter the fuel lines.

3. The engine lost power just after lift-off due to fuel starvation.

4. The runway remaining was not sufficient for a landing, and a forced landing had to be carried out on a ploughed field.

**Other:**

-Nil-

## CESSNA 152 C-GZKN
## BAIE-COMEAU, QUEBEC
## 24 FEBRUARY 1986

REPORT NUMBER: 86-Q60007 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1102 EST
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 17 | 17 |
| LAST 90 DAYS | 9 | 9 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *SUMMARY REPORT:*

The student pilot was making his fourth solo flight in the circuit. He was making his third touch-and-go landing of the day. Although the aircraft had not yet slowed and was rolling at about 65 knots, the pilot performed his take-off checks. At the same time, he applied left rudder in order to return to the centre of the runway. The right wing suddenly lifted, and the aircraft turned to the left. After a few zigzags, the aircraft left the runway on the left side, about 2,500 feet from the threshold. It struck a snowbank and came to rest about 20 feet farther on.

The weather conditions were suitable for visual flight rules (VFR) flight and the wind was 270 degrees at five knots. Runway 28, which is 6,000 feet long, was in use; at 1100 EST the conditions were as follows: 80 per cent bare and dry, 20 per cent snow covered and ice at the edges. The student pilot had flown regularly in the weeks preceding the accident. He had demonstrated his competence during a check flight a few days earlier.

The Cessna 152 operating manual recommends that, in zero wind conditions, the approach be made at 60 to 65 knots and that the aircraft be landed at about 40 knots. According to the controllers on duty, the aircraft approached at a speed greater than that usually observed for aircraft of this type. The landing was normal, and the aircraft touched down on the first third of the runway.

Since the approach and landing speeds were higher than normal, the controls were more effective than during a normal landing. In addition, the pilot's attention was concentrated on the interior of the cabin, because he was performing his checks in preparation for the next take-off. When he used the rudder pedals to return to the centre of the runway, the aircraft changed direction very quickly. The wing on the outside of the turn received more lift and rose. The turn became sharper, and the aircraft crossed to the other side of the runway centre line. Although the pilot attempted to regain control with the rudder pedals, the aircraft again zigzagged until it left the runway. Because of his limited experience and inattention, the pilot was unable to anticipate the behaviour of the aircraft and make corrections appropriate to the high speed.

### *FINDINGS:*

**Cause Related:**
1. The aircraft landed at an excessive speed.

2. The pilot performed his take-off checks before allowing the aircraft to slow and ensuring that he had directional control.

3. The rudder pedals were operated too vigorously for the speed and the required correction.

**Other:**
-Nil-

## VIRDEN AVIATION LTD.
## CESSNA 172N C-GPNK
## VIRDEN (West) AIRPORT, MANITOBA
## 10 MARCH 1986

BRIEF NUMBER: 86-C60016 (Accident)
LOCAL TIME: 1445 CST
OPERATION: Specialty Flying Training
DAMAGE: Minor
PILOT LICENCE: Commercial

PILOT HOURS:

| | INSTRUCTOR | | STUDENT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 1,050 | 700 | 55 | 8 |
| LAST 90 DAYS | 200 | 150 | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

### *REPORTED CIRCUMSTANCES:*

As part of a check-out on type, the student was doing circuits with the instructor. The student was correcting for a left cross-wind of about five knots on the ap-

proach, but, close to the runway, the effect of the wind was reduced because of trees along the left side of the runway.

The student did not take off the correction for the landing, and the aircraft drifted to the left after it touched down. Before the instructor could take control, the aircraft got too close to the edge of the runway, and the stabilizer made contact with a runway marker, causing minor damage.

The instructor reported that the student froze on the controls and that he had difficulty taking control from him.

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NIGHTHAWK FLYING CLUB INC.
CESSNA 150M C-GUKF
DENYES LAKE, ONTARIO
03 APRIL 1986

REPORT NUMBER: 86-O/60015 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1430 EST
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 55 | 46 |
| LAST 90 DAYS | 11 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***HISTORY OF THE FLIGHT:***

The pilot and passenger departed Iroquois Falls about midday to check out several lakes in the area west of Timmins, Ontario, for future fishing trips. Over Denyes Lake, the pilot descended from his en route altitude to about 600 feet above ground level (agl). After a few minutes at low level, the pilot applied full power in order to gain altitude; the engine sputtered and lost power. The pilot turned the aircraft through 180 degrees and force-landed on the frozen surface of Denyes Lake. During the latter stages of the roll-out, the three landing gear broke through an upper layer of ice, and the nose gear collapsed. The aircraft came to rest on the ice.

***PERTINENT INFORMATION:***

The weather reported for Timmins at 1400 EST was estimated ceiling 3,000 feet broken, 8,000 feet overcast, visibility 15 miles, temperature three degrees Celsius, dewpoint minus eight degrees Celsius, and wind 050 degrees at five knots. The ceiling at 3,000 feet consisted of six-tenths of stratocumulus cloud. At the reported temperature and dewpoint, light carburettor icing could be expected in cruise or descent.

During his descent over Denyes Lake, the pilot reduced the power to about 2100 rpm and maintained this setting until he applied full power to begin the climb-out.

Carburettor heat was not used during the flight to prevent or check for carburettor icing. During the forced approach, the pilot did not perform any emergency check-list procedures in an attempt to determine the cause of the power loss or to restore power. The engine backfired several times as the aircraft began to climb. The pilot's knowledge of carburettor icing and the use of carburettor heat was lacking.

There were heavy black carbon deposits on all the spark plugs. The fuel and air systems forward of the firewall were inspected and found to be free of contaminants, and they functioned normally. A temporary source of fuel was supplied to the engine, which was started and run up to 1500 rpm for a few minutes. The spark plugs were examined again, and the black carbon deposits had started to turn brown, the normal operating colour. No engine discrepancies were noted.

***ANALYSIS:***

Black carbon deposits on the spark plugs are indicative of an overrich fuel/air mixture which can be caused by carburettor icing. Engine backfiring is also consistent with carburettor icing as ice restricts fuel discharge at the nozzle. It was concluded that the engine lost power because of carburettor icing.

***FINDINGS:***

**Cause Related:**
1. The aircraft engine lost power because of carburettor icing.

2. The pilot did not carry out any emergency procedures to restore engine power.

**Other:**
-Nil-

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## RISK OF COLLISION BETWEEN: CESSNA 172 C-GMYA and VEHICLE-TELECOM MAINTENANCE HALIFAX AIRPORT, NOVA SCOTIA 14 MAY 1986

LOCAL TIME: 1029 ADT
INFORMATION SOURCE: Field Investigation

CESSNA 172 C-GMYA
REPORT NUMBER: 86-A64031 (Incident)
OPERATION: Private Recreational
DAMAGE: None
PILOT LICENCE: Private

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | N/A | N/A | N/A | N/A |
| LAST 90 DAYS | N/A | N/A | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

TELECOM VEHICLE
REPORT NUMBER: 86-A64031 (Incident)
OPERATOR: Department of Transport
OPERATION: Transportation
DAMAGE: None
PILOT LICENCE: Not applicable

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *SUMMARY REPORT:*

The tower controller cleared the aircraft to land on runway 33. At the same time, a telecom vehicle was granted permission by the ground controller to proceed to the terminal ramp. The vehicle proceeded onto the edge of the runway but stopped when the operator observed the landing aircraft. The pilot of the aircraft saw the vehicle stop and he continued the approach, extending the approach to land beyond the vehicle. The vehicle then pulled out onto the runway and followed the aircraft at a safe distance.

The telecom vehicle was positioned on the "receiver road" which is located east of runway 33, approximately 2,000 feet from the threshold. There is also a "radar road" on the opposite side of the runway from the receiver road. The radar road has direct access to the ramp area without crossing the active runway. The vehicle operator identified his position as being on the receiver road and received a clearance from the ground controller to proceed to the ramp area. This clearance authorized the driver to transit the active runway to his destination.

The instructions issued by the ground controller were incomplete according to the requirements of the Air Traffic Services Manual of Operations (MANOPS). The controller did not issue specific directions as to how the vehicle was to proceed to the ramp. The ground controller believed that he heard the telecom operator request permission to proceed to the ramp, from a position on the radar road. The vehicle could have proceeded to the ramp from this position without crossing the active runway, and, as a result, clearance to proceed was granted. The occurrence could have been avoided if the ground controller had issued instructions in accordance with MANOPS.

### *FINDINGS:*

**Cause Related:**
1. The ground controller cleared a vehicle to proceed onto the active runway while an aircraft was preparing to land.

**Other:**
-Nil-

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## MCMURRAY AVIATION CESSNA 152 C-GZSA LA LOCHE, SASKATCHEWAN 10 mi SE 06 JUNE 1986

REPORT NUMBER: 86-W60018 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1430 MDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 41 | 41 |
| LAST 90 DAYS | 16 | 16 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The student pilot was on his first solo cross-country flight. It was a triangle from Fort McMurray to Conklin, to Lac La Biche, then direct to Fort McMurray. He landed at Conklin, and, after a stop of less than five minutes, he continued on to Lac La Biche where he stopped for 10 to 15 minutes. One hour and 40 minutes after he departed Lac La Biche, the engine stopped and the student pilot force-landed the aircraft in muskeg, 70 miles east of Fort McMurray. The aircraft nosed over during the landing roll.

The student pilot's flight plan showed total fuel requirements of 19.8 Imperial gallons. The aircraft holds 20.4 Imperial gallons of usable fuel. The total time in the air was calculated to be 4 hours and 10 minutes. From the endurance profile in the Cessna manual, time to fuel exhaustion, for the flight flown, should have been just over four hours. However, the pilot was in the air approximately 50 minutes extra before landing at Lac La Biche.

The student pilot's instructor believed that he had instructed the student pilot to refuel at Lac La Biche, but this was not understood by the student pilot, nor was it emphasized by the chief pilot when he dispatched the student.

The student pilot was experiencing difficulty in map reading. The wind forecast for the trip was from the northwest at 8 to 10 knots, and, although it did not increase appreciably, the turbulence became more severe. As the turbulence developed, the student pilot found it increasingly difficult to set the directional gyro with the magnetic compass.

During previous training, the student pilot had had difficulty planning and flying his dual cross-country flight, although after further ground and air instruction, he was considered to be capable of flying a solo cross-country flight. On the occurrence flight, he had difficulty finding Lac La Biche; he was located 20 miles to the west and directed via radio to his destination by another pilot. On the leg to Fort McMurray, the student pilot again became lost and was about 70 miles off track to the east when he force-landed the aircraft.

The difficulty in map reading aggravated by the effect of the turbulence on the compass caused the pilot to be unsure of his position on the flight into Lac La Biche and again on the return flight to Fort McMurray. He was approximately 50 minutes late arriving at Lac La Biche, with the result that he took off from Lac La Biche without the required 45-minute visual flight rules (VFR) fuel reserves, and the engine stopped because of fuel exhaustion.

The assessment by the instructor that the student pilot was capable and ready for a solo cross-country flight was premature.

***FINDINGS:***

**Cause Related:**
1. The engine stopped because of fuel exhaustion.

2. The student pilot took off from Lac La Biche without VFR fuel reserves.

3. The student pilot became lost because of his limited navigational ability, aggravated by the effect of turbulence on the magnetic compass.

4. The student pilot was prematurely assessed as being ready for his solo cross-country flight.

**Other:**
-Nil-

CHARLOTTETOWN FLYING SERVICES (1981) LIMITED
PIPER PA-28-140 CHEROKEE C-GDVT
CHARLOTTETOWN, PRINCE EDWARD ISLAND
27 JUNE 1986

BRIEF NUMBER: 86-A60022 (Accident)
LOCAL TIME: 0805 ADT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 23 | 17 |
| LAST 90 DAYS | 20 | 17 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was returning to the airport after a local training flight. The approach and flare for touchdown were normal; however, after the flare, the aircraft ballooned. The pilot kept the nose of the aircraft up, and the speed decreased. The aircraft then descended and struck the runway with sufficient force to shear the nosewheel.

## CESSNA 172 C-GFVP
## CRYSTAL LAKE, ONTARIO
## 29 JUNE 1986

REPORT NUMBER: 86-C60055 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1400 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 45 | 9 |
| LAST 90 DAYS | 10 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | 3 |

*SUMMARY REPORT:*

The pilot and four passengers were departing on a local recreational flight. Shortly after lift-off, the aircraft rolled left and right before it descended rapidly, crashing into a wooded area.

The take-off was from a 3,500-foot gravel runway in excellent weather conditions and light winds.

The aircraft's centre of gravity was within limits; however, the take-off weight was calculated to be approximately 58 pounds above the maximum allowable. An eight-year-old child sat on the lap of one of the passengers occupying one of the rear seats of the four-seater aircraft; there were five persons on board. Although the child and passenger shared the same seatbelt, both of them escaped serious injury.

The pilot had minimal flying experience and had not flown this type of aircraft at or near its maximum allowable take-off weight. He elected to use the soft-field take-off technique and selected 15 degrees of flap. The pilot operating handbook stipulates that flap settings greater than 10 degrees are not approved for take-off. Higher settings will increase the drag and reduce climb performance.

During the take-off roll, the pilot became concerned about the lack of acceleration and closed the throttle with the intention of rejecting the take-off. At this time, the aircraft unexpectedly became airborne. Full power was reapplied, and the pilot attempted to climb away at low speed.

The incorrect flap position and overweight condition combined to reduce acceleration and increase the ground roll. The inexperienced pilot first rejected the take-off, then decided to continue. Because of this action the aircraft took off in a nose-high attitude and near-stall condition. When the pilot attempted to climb away, the aircraft stalled, flicked left, and crashed.

*FINDINGS:*

**Cause Related:**
1. The aircraft stalled after take-off because of incorrect pilot technique.

**Other:**
1. The aircraft exceeded the maximum allowable take-off weight.

2. There were five persons on board the aircraft which is certified to carry a maximum of four.

3. The pilot was inexperienced and had not previously flown the aircraft type at or near maximum allowable take-off weight.

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## COLLISION BETWEEN: CESSNA 172 C-GZTH and ULTIMATE AEROBATICS 10-100/180 C-GIKZ
## GUELPH AIRPORT, ONTARIO
## 23 JULY 1986

LOCAL TIME: 1835 EDT
INFORMATION SOURCE: Field Investigation

CESSNA 172 C-GZTH
REPORT NUMBER: 86-O/60801 (Accident)
OPERATION: Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 495 | 35 | 27 | 12 |
| LAST 90 DAYS | 224 | 28 | 12 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

ULTIMATE AEROBATICS 10-100/180 C-GIKZ
REPORT NUMBER: 86-O/60802 (Accident)
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 410 | 5 |
| LAST 90 DAYS | 18 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

A Cessna 172 aircraft and an Ultimate 10-100 biplane were on short final approach to land on runway 14 at Guelph Airport when they collided. The aircraft were about 264 feet down the runway from the threshold at an altitude of about 50 feet above ground level (agl) when the collision occurred. After the collision, both aircraft descended separately onto the runway and skidded to a stop. The pilot of the biplane was seriously injured.

Guelph Airport is an uncontrolled aerodrome with a designated aerodrome traffic frequency (ATF). Both aircraft were operating under visual flight rules (VFR), with Guelph Airport as the departure and destination aerodrome.

During a flight in the local area, the pilot of the Ultimate aircraft was unable to establish two-way radio communication and returned to land. No position reports were made, and a listening watch on the ATF was not maintained. Prior to the Ultimate aircraft joining the circuit, the Cessna 172 instructor pilot and student pilot had completed about four circuits following a Cessna 150. Position reports were made on the ATF during each circuit.

The first aircraft in sequence to land was the Cessna 150. This pilot reported on the ATF that he was on final approach to land. Both the Cessna 172 and the Ultimate had the Cessna 150 in sight. The Cessna 172 pilot then made a position report on the ATF that he was on final approach for runway 14, number two, at Guelph. This position report was heard by the pilot of the Cessna 150 who was still on short final approach, but it was not heard by the pilot of the Ultimate who was on the downwind leg. The Ultimate turned from the downwind leg as the Cessna 172 continued on final approach. Each aircraft proceeded until they were both over the runway at about 50 feet agl. Just prior to the collision, the Ultimate was observed to be directly over the Cessna 172.

The cockpit visibility of the Cessna 172 was limited in the extreme upper left and right quadrants because of the aircraft's high-wing design. The Ultimate aircraft cockpit visibility was also restricted in the front left and right quadrants because of the aircraft's elongated nose and high- and low-wing design. There was no evidence of any mechanical failure in either aircraft; however, the Ultimate pilot's headset speaker was defective and caused the speaker to disconnect intermittently from the audio circuit.

The Cessna 172 had a tire mark on the roof just behind the windshield, a broken windshield, and another tire mark aft of the engine oil access panel. The Ultimate had a propeller slice through the fuselage directly underneath the pilot's seat and a second propeller strike about 18 inches further aft. The Ultimate struck the runway hard enough to bend the fuselage. The pilot was wearing a six-point safety harness which held.

The exact flight path of each aircraft could not be determined; however, based on their respective positions to the Cessna 150, the Ultimate was the third aircraft in the landing sequence, and, therefore, should have followed the Cessna 172. Although neither pilot saw each other prior to the collision, the pilot of the Cessna 172 did make position reports and monitor the ATF. These reports were not heard by the pilot of the Ultimate because he did not monitor the ATF when he joined the circuit and made no position reports. Had he done so, the Cessna 172 crew would have been alerted to his position in the circuit. As the Cessna 172 continued on final approach and the Ultimate turned from the downwind leg, the opportunity to see each other was degraded because of the characteristic blind spots inherent in each aircraft design. The impact information indicated that the Cessna 172 was struck from above by the tail wheel of the Ultimate and that the Cessna 172 propeller sliced through the bottom of the Ultimate fuselage in two locations.

***FINDINGS:***

**Cause Related:**

1. The pilot of the Ultimate aircraft made no position reports and did not monitor the ATF.

2. The pilot of the Ultimate aircraft began his turn from the downwind leg without adequate provision for the other circuit traffic.

3. Neither pilot saw the other aircraft in time to avoid the collision.

4. The aircraft were in collision while attempting to land simultaneously on the same runway.

**Other:**
-Nil-

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FALLS AVIATION LIMITED
FLEET 80 CANUCK CF-DZM
WELLAND, ONTARIO
26 JULY 1986

REPORT NUMBER: 86-O60062 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1715 EDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 450 | 45 | 280 | 5 |
| LAST 90 DAYS | 80 | 25 | 10 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot had been experiencing difficulty maintaining directional control of the aircraft during the landing roll, and he decided to enlist the services of a flight instructor for some dual instruction. The take-off was normal, but, on final approach, the airspeed was allowed to decrease, and the aircraft stalled. Full power was applied in an attempt to recover from the stall; however, the aircraft landed hard, and the right main landing gear collapsed.

While on final approach, both the pilot at the controls and the flight instructor were concentrating on the directional control of the aircraft, and neither one was monitoring the airspeed. As a result, the airspeed was allowed to decrease to the point where the aircraft stalled with insufficient altitude for either pilot to execute a recovery.

***FINDINGS:***

**Cause Related:**
1. The airspeed was allowed to decrease, and the aircraft stalled and landed hard on the runway.
2. Neither the pilot at the controls nor the instructor recognized the onset of the stall in time to recover.

**Other:**
-Nil-

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PACIFIC FLYING CLUB
CESSNA 172 C-GOOV
CYPRE RIVER AIRPORT, BRITISH COLUMBIA
04 AUGUST 1986

BRIEF NUMBER: 86-P60041 (Accident)
LOCAL TIME: 1330 PDT
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 141 | 69 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

***REPORTED CIRCUMSTANCES:***

The aircraft was set up on final approach with full flap. On touchdown, the aircraft bounced, floated, then landed again half-way down the runway. Heavy braking was applied, and the aircraft moved to the left. As the aircraft neared the runway end, the left wing contacted alder saplings at the runway edge, causing the aircraft to veer left and run into a stand of large alders.

The private runway was 2,500 feet long by 40 feet wide and gravel surfaced. The saplings were growing on the runway surface near the edge of the runway.

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## CESSNA A150L AEROBAT CF-HGA
## LIVERPOOL AIRPORT, NOVA SCOTIA 1/2 mi N
## 05 AUGUST 1986

REPORT NUMBER: 86-A60028 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1635 ADT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,200 | 20 |
| LAST 90 DAYS | 20 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot was practising aerobatics for an upcoming aerobatic display at Liverpool. He entered a horizontal snap roll to the left at 80 mph, 1,500 feet above ground level (agl) with the intention of completing one and one-half rolls. Recovery was to be in the inverted position followed by a half loop. Roll recovery was initiated after the first complete roll, but the aircraft did not respond; instead, it entered an unintentional spin to the left. The pilot attempted to recover from the spin, but the aircraft did not recover and continued to spin until it crashed into a heavily treed area with trees up to 50 feet high. At impact, the aircraft was descending vertically with no horizontal velocity and in a nose-low attitude.

The pilot, who was wearing an aerobatic-style harness, sustained only minor injury in a very serious accident. When the aircraft descended into the tall trees, the right wing was impaled near the wing root by a tree. The energy of the falling aircraft was dissipated in tearing off the tree branches and in enlarging the hole in the wing. The aircraft stopped one foot from the ground, suspended by the trees.

The weather was good with scattered clouds above 5,000 feet, there were no restrictions to visibility, and the wind was light. The airshow had been authorized by Transport Canada with a minimum aerobatic altitude of 1,000 feet agl. The investigation did not reveal any pre-impact aircraft failures or malfunctions.

The recovery from a snap roll is normally accomplished by applying full rudder in the direction opposite to the roll, followed by forward elevator control to break the stall. This is basically the method described in the Cessna 150 Aerobat Owner's Manual.

The day before the accident, the pilot had studied the spin-recovery technique recommended by Eric Muller in his book 'Flight Unlimited', published in 1983. Muller's technique for "conventional aerobatic aircraft, like for example, a Stampe, Pitts, Laser, Zlin, CAP, etc.," is to apply "full-opposite rudder, stick back and in-spin, motor cut to idle." The pilot of the accident aircraft stated he used this procedure; however, the aircraft did not recover from the spin, nor did it show any signs of recovering.

Prior to certification, an aircraft designed as an aerobatic aircraft (like the Cessna 150 Aerobat) must pass stringent and dedicated spin testing. The Federal Aviation Administration approved the spin-recovery technique published in the Cessna 150 Aerobat Owner's Manual as being the best for that aircraft. Although the procedure advocated by Muller may work, it is not certain that it will work every time, and moving the stick aft during spin recovery is contrary to well-established, proven, and published techniques.

*FINDINGS:*

**Cause Related:**
1. The pilot entered a spin from which he was unable to recover.

2. The spin-recovery technique used by the pilot was not the approved and published technique outlined in the aircraft owner's manual.

**Other:**
1. The pilot, who was wearing an aerobatic-style harness, sustained only minor injury in a very serious accident.

## LONDON FLYING CLUB OF CANADA
## PIPER PA-28-140 CHEROKEE C-GDYC
## LONDON AIRPORT, ONTARIO
## 06 AUGUST 1986

BRIEF NUMBER: 86-O/60063 (Accident)
LOCAL TIME: 1610 EDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 39 | 39 |
| LAST 90 DAYS | 18 | 18 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The student pilot was practising circuits on runway 15. On the second landing, the aircraft touched down heavily and started to porpoise. The pilot attempted to hold the aircraft on the ground with forward pressure on the control wheel; the aircraft wheelbarrowed, and the pilot lost directional control. The aircraft veered left and came to rest on the infield.

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## CONQUEST AVIATION
## PIPER PA-28-181 ARCHER II C-GNPB
## VINELAND, ONTARIO
## 10 AUGUST 1986

REPORT NUMBER: 86-O/60067 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0930 EDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,265 | 700 |
| LAST 90 DAYS | 150 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The purpose of the flight was to instruct the pilot in the left seat in the techniques of operating from a grass runway. The runway was 1,400 feet long with a maintained grass surface which was wet with dew. Thirty minutes prior to the accident, the closest meteorological station, St. Catharines, reported the winds to be 170 degrees at six knots.

The approach was flown with full flap extended. The pilot applied the brakes but did not feel any deceleration. He then released the brakes and reapplied them, but still felt no deceleration. The instructor took over control at about midway down the runway. He too applied the brakes. The aircraft overran the end of the runway, then slid down a five-foot embankment and across a concession road; the nose gear and the right main gear collapsed.

The brakes were serviceable when the aircraft left St. Catharines, and there were skid marks in the dirt patches of the runway, indicating that the brakes were working and that the wheels were locked up. The heavy dew resulted in very poor braking action, and, as a result, the aircraft could not be stopped on the remaining runway.

***FINDINGS:***

**Cause Related:**
1. The grass runway was wet with dew, resulting in poor braking action.

2. The aircraft could not be stopped on the runway because of the poor braking action.

**Other:**
-Nil-

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## AIR TUTEUR LTEE
## CESSNA 152 C-GZLE
## ST-HUBERT AIRPORT, QUEBEC
## 19 AUGUST 1986

REPORT NUMBER: 86-Q60045 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1907 EDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 45 | 45 |
| LAST 90 DAYS | 12 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *SUMMARY REPORT:*

The student pilot was authorized to practise take-offs and landings after completion of a dual instruction flight. On his second landing attempt, the student pulled back on the control column, and the aircraft ballooned. He left the power at idle and pushed the control column forward. The aircraft contacted the runway, bounced back in the air before it settled down and began rocking. The student applied right rudder; however, directional control was not maintained, and the aircraft ran off the side of the runway and came to rest in a ditch, 300 feet to the left.

The weather was clear, and the wind was blowing 13 degrees from the right at five knots. Examination of the aircraft did not reveal any pre-occurrence malfunctions or failures. The student had flown two hours solo previously. During the landing roll, he did not use the brakes until the aircraft was off the runway.

During the landing, the student misjudged the round-out and allowed the aircraft to balloon. As he did not use power, the aircraft contacted the runway and bounced back in the air before settling down. Although the student had applied opposite rudder, this was ineffective, and the aircraft continued to veer left. The use of rudder without application of right brake pressure on the runway was not sufficient for the student to regain and maintain directional control of the aircraft.

### *FINDINGS:*

**Cause Related:**
1. The student pilot misjudged the round-out, and, when the aircraft ballooned, his input was insufficient to regain control.

**Other:**
-Nil-

## SKYWAYS
## PIPER PA-31-350 CHIEFTAIN C-GQHV
## WATERLOO-WELLINGTON AIRPORT, ONTARIO
## 19 DECEMBER 1985

REPORT NUMBER: 85-O/50095 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2251 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,010 | 650 |
| LAST 90 DAYS | 60 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *HISTORY OF THE FLIGHT:*

The pilot selected the landing gear down as the aircraft passed over the outer marker while on final approach to runway 24R at Toronto/Lester B. Pearson International Airport. The green down-and-locked lights were obtained for the nose and right gear but not for the left gear. The red warning light remained illuminated, and the gear handle did not return to the neutral position.

The pilot cycled the landing gear numerous times; however, he was unsuccessful in obtaining the left gear down-and-locked light. After the gear emergency extension procedures failed to provide a left gear safe light, the pilot decided to overshoot and divert to his base at Waterloo-Wellington Airport.

Upon arrival at Waterloo-Wellington, the pilot again selected the gear down and flew the aircraft past the control tower. The controller confirmed that the left gear was up and the nose and right gear were down. The pilot retracted the nose and right gear and then carried out a wheels-up landing.

***PERTINENT INFORMATION:***

An examination of the aircraft revealed that the left main gear door did not open. The door actuator was examined, and the plunger spring located inside the actuator was found broken in five pieces, jamming the plunger in the mechanical lock. The laboratory analysis of the spring indicated that the fractures were consistent with those of an overload failure, the cause of which was not determined.

***ANALYSIS:***

The door actuator plunger spring failed in overload for undetermined reasons. The broken spring jammed the plunger which prevented the gear door from opening. As a result, the left landing gear could not be lowered.

The following laboratory report was completed:
LP 30/86 - Gear Door Actuator Spring.

***FINDINGS:***

**Cause Related:**
1. The door actuator plunger spring failed in overload for undetermined reasons.

2. The broken spring jammed the plunger which prevented the gear door from opening.

3. The pilot decided to carry out a wheels-up landing rather than land with only the nose and right main gear extended.

**Other:**
-Nil-

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## SHUSWAP FLIGHT CENTRE
## CESSNA 172M C-GIJH
## MOUNT IDA, BRITISH COLUMBIA
## 11 JANUARY 1986

REPORT NUMBER: 86-P60002 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1520 PST
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 55 | 55 |
| LAST 90 DAYS | 34 | 34 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***SUMMARY REPORT:***

The newly licensed pilot and his two passengers took off in the late afternoon on a local area sightseeing flight. En route to the passengers' farm, the pilot attempted to fly the aircraft over an alpine ridge; however, as he approached the mountain, the aircraft rate of climb decreased. The aircraft was too low to clear the top of the ridge and was too near the stalling speed to safely turn away from the mountain; so the pilot crash-landed the aircraft in tall trees. There were no injuries, although neither the pilot nor the front-seat passenger was wearing the available shoulder harness.

The pilot did not recognize that he had entered an area of downdrafts, and he unsuccessfully attempted to increase the rate of climb by raising the aircraft's nose. Because the aircraft was too low to clear the top of the ridge and too near the stalling speed to turn, the pilot elected to land in the tree-tops, while he was still in control of the aircraft.

The pilot did not request weather information before the flight because the sky was clear and the wind at the airstrip was light. The pilot was also rushed because it was late in the afternoon and he was required to land before dark. Winds known to produce downdrafts were forecast by Environment Canada, and downdrafts were encountered by pilots flying in the local area.

The pilot's recent flying training included mountain flying techniques and procedures; however, on this occasion, he attempted to overfly the mountain ridge before he had climbed to a safe height.

***FINDINGS:***

**Cause Related:**
1. The pilot did not climb to a safe height before he attempted to overfly a mountain ridge.

2. The pilot did not obtain a weather briefing before flight.

**Other:**
1. The pilot and front-seat passenger both escaped injury; neither was wearing the available shoulder harness.

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## EASTERN FLYING SERVICES
## SWEARINGEN SA26AT C-GVCO
## DEER LAKE, NEWFOUNDLAND
## 22 JANUARY 1986

REPORT NUMBER: 86-A60005 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1910 NST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 3,000 | 900 | N/A | N/A |
| LAST 90 DAYS | 180 | 90 | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

***HISTORY OF FLIGHT:***

The aircraft was departing on the final leg of a scheduled courier flight with the pilot-in-command at the controls. As the power was applied for take-off, the aircraft started to roll and swing to the right. The pilot was unable to maintain directional control, either with power and/or brake application, and the propellers were feathered and the engines shut down.

The aircraft contined to roll and struck a snowbank that had been cleared from the runway. When the landing gear struck the snow, the nose gear collapsed. The aircraft came to a stop resting on its nose.

***PERTINENT INFORMATION:***

During take-off in this aircraft, directional control is normally maintained by the use of a nosewheel steering control. The nosewheel steering in this aircraft was known to be faulty in a turn to the left, so the pilots were using brake applications early in the take-off roll to maintain directional control.

When the swing initially developed, the pilot applied left brake but got no response. Further application of the brake then resulted in the brake pedal collapsing flat onto the floor, without any braking action at all. The pilot, realizing that he could not maintain directional control, called for the stop and feather check which shuts off the fuel and feathers the propellers.

The pilot stated that they had not experienced any braking problems prior to the occurrence and that the system seemed to have functioned correctly on any previous brake application.

Examination of the brake system, which was manufactured by Beechcraft Corporation, revealed that, although there was fluid and pressure available to the right brake assembly, there was neither fluid nor pressure present at the left brake. The brake fluid reservoir was also found to be empty; however, there was no indication of any fluid leaks in the system. The right wheel brake assembly showed signs of overheating due to the brake dragging, as indicated by the purple discolourization of the brake drums and discs. Beechcraft Service Instruction 0259-218 outlines a required brake adjuster spring adjustment check.

The brake fluid reservoir is located in the forward radio compartment; removal of several radio components is required to gain access to the reservoir.

The drag link bolt, which connects the nose gear drag link to the nose gear strut, was found to be broken having sheared in overload. This allowed the nose gear to collapse rearward when the strut struck the snowbank.

***ANALYSIS:***

The dragging right brake was the result of zero brake clearance on three of the six adjuster spring housing assemblies. The dragging brake resulted in abnormally high operating temperatures which caused the compression springs to lose their strength gradually. The brake ultimately seized during the take-off, making directional control impossible. The required Beechcraft Service Instruction 0259-218 had not been carried out since the brake unit had been installed.

The lack of brake fluid in the reservoir and to the left wheel brake assembly prevented the use of left brake to assist in directional control. As there were no fluid leaks found in the system, it is believed that the fluid probably evaporated over a period of time, because of the higher temperatures generated as a result of the dragging brake. Due to the difficulty in checking the brake fluid reservoir, it is likely that the fluid level was not monitored on a timely basis.

Damage to the nosewheel steering mechanism when the nose gear collapsed made it impossible to determine what had caused the original faulty nosewheel steering.

***FINDINGS:***

**Cause Related:**

1. As a result of zero adjuster spring clearance in the wheel brake assembly, the right wheel brake seized and caused an uncontrolled swing during the take-off roll.

2. The application of left brake was ineffective in maintaining directional control because there was insufficient fluid remaining in the system to activate the left brake.

3. The required Beechcraft Service Instruction 0259-218 had not been carried out on the wheel brake assembly.

4. The drag brace bolt sheared in overload when the nose gear struck the snowbank.

**Other:**

1. The brake fluid reservoir is positioned in the forward radio compartment which makes regular monitoring of the fluid level difficult.

## SOUNDAIR CORPORATION
## CESSNA 402C C-GIKA
## TORONTO/LESTER B. PEARSON INTERNATIONAL AIRPORT, ONTARIO
## 27 JANUARY 1986

REPORT NUMBER: 86-O/64011 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2140 EST
OPERATION: Charter
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,200 | 45 |
| LAST 90 DAYS | 200 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The aircraft landed on runway 33 at night and cleared the runway via Hotel taxiway. The ground controller issued the pilot a taxi instruction to turn left on Romeo, left on Golf, and hold short of runway 15. The aircraft taxied along Romeo but, instead of turning left on Golf, proceeded straight down Romeo, crossing 24 right, an active runway. He then held short of runway 15 at Juliett taxiway where the deviation from the taxi instructions was discovered by ATC.

***PERTINENT INFORMATION:***

The visibility was one and three-quarter miles in light snow and the winds were 330 degrees at 10 to 15 knots.

To avoid conflict with aircraft taxiing from the north or south end of the airport for departures on runway 24 right, the controller instructed aircraft arriving on runway 33, and going to the north end of the airport, to take the longer routing.

The visibility was reduced in light snow, and the ground controller was not always able to visually monitor the movement of aircraft under his control. The airport surface detection equipment (ASDE) radar was not serviceable. The controller was not aware that the aircraft had deviated beyond the authorized taxi limit and crossed an active runway until another aircraft, taxiing along the same routing given to GIKA, brought it to his attention.

The pilot was not very familiar with the airport and had the aerodrome diagram available for reference. Although he repeated the correct taxi instruction back to

the controller, he was expecting the more direct routing to his destination on the airfield. The pilot stated that his attention was diverted because of other cockpit duties when he received the taxi instruction.

***ANALYSIS:***

Because the pilot was occupied in the cockpit when he received the taxi instructions, he was shifting his attention between the two events. Although he heard the taxi instructions, he did not fully comprehend them and proceeded to taxi along the route he had expected to receive from the controller. The controller was unable to visually detect the deviation because the visibility was reduced by snow and the ASDE radar was not serviceable.

***FINDINGS:***

**Cause Related:**
1. The pilot did not comply with the ground controller's instructions, and, as a result, he crossed an active runway without clearance.

2. The ground controller was unable to monitor the movements of the aircraft because of poor visibility and the unserviceability of the ASDE radar; as a result, he did not detect an unauthorized deviation from taxi instructions.

**Other:**
-Nil-

## PIPER PA-28R-200 C-GHXP
## BROCKVILLE AIRPORT, ONTARIO
## 31 JANUARY 1986

REPORT NUMBER: 86-O/60003 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 0940 EST
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 172 | 4 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***SUMMARY REPORT:***

The aircraft was preparing to land on runway 22, with a right cross-wind from approximately 270 degrees magnetic, at 10 knots. On touchdown, the aircraft bounced, swung to the left, and ran off the runway. The landing gear struck a mound of frozen earth, and the nose and left main gear collapsed.

During the approach to land, the wind had become gusty and had shifted to approximately 330 degrees. The pilot experienced a higher than normal sink rate on final, and, after touchdown, he was not able to maintain directional control of the aircraft.

The wind at touchdown was 110 degrees to the runway heading; however, the wind speed did not exceed the cross-wind limitation for the aircraft.

***FINDINGS:***

**Cause Related:**
1. The pilot did not maintain directional control of the aircraft after touchdown in gusty cross-wind conditions.

2. The aircraft ran off the runway and struck a mound of earth, causing the nose and left main landing gear to collapse.

**Other:**
-Nil-

## VICTORIA FLIGHT CENTRE
## PIPER PA-31-310 NAVAJO C-GITQ
## KELOWNA AIRPORT, BRITISH COLUMBIA
## 18 FEBRUARY 1986

REPORT NUMBER: 86-P60006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1830 PST
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,500 | 500 |
| LAST 90 DAYS | 180 | 180 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The aircraft was on a flight from Castlegar to Vancouver with a stop in Kelowna. While the aircraft was parked on the ramp in Kelowna, the pilot noted that the main gear doors were open. Following engine start for departure, the pilot decided to close the gear doors by selecting the gear handle from the NEUTRAL position to the DOWN position. However, he inadvertently selected the UP position. The anti-retraction system failed, and the nose gear collapsed, bending the nose gear doors and both propellers.

***PERTINENT INFORMATION:***

The Piper Navajo landing gear system has a solenoid-operated locking mechanism located behind the instrument panel at the forward end of the gear selector lever. This forms part of the selector assembly and prevents the gear selector lever from being moved to the UP position while the aircraft is on the ground. The solenoid is spring-loaded to the locked position and is activated by an anti-retraction microswitch on the main gear.

The portion of the gear selector flange, under which the solenoid pin extended to prevent movement, was worn and rounded. There was also a small amount of play in the solenoid assembly itself. The manufacturer's 100-hour landing selector mechanism inspection requires a check for solenoid security of attachment and plunger operation.

***ANALYSIS:***

The manufacturer's inspection requirements only ensure solenoid security of attachment and plunger operation; there is no requirement for checking normal operation of the anti-retraction system.

An incomplete gear down sequence precipitated this occurrence. Following the previous landing gear down selection, the gear doors opened, the gear extended, and the main landing gear doors then failed to close. Cause for this failure could not be determined.

The pilot noticed that the main gear doors were open and attempted to close the doors by selecting the gear down; the pilot inadvertently selected gear up instead of down. Normally the anti-retraction system would prevent an up selection. However, the slightly loosened solenoid switch combined with the rounded flange allowed the landing gear selector lever to be selected up. The up selection initiated the gear retraction sequence, causing the nose gear to collapse.

***FINDINGS:***

**Cause Related:**

1. The landing gear anti-retraction system failed because of worn and loose components and, as a result, allowed the pilot to select the gear up.

2. The pilot inadvertently selected the gear handle to the UP position instead of the DOWN positon.

3. The manufacturer's 100-hour inspection procedure did not ensure proper operation of the anti-retraction system.

**Other:**

-Nil-

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SNOWBIRD AVIATION LTD.
PIPER PA-31-310 NAVAJO C-GELD
STONY RAPIDS, SASKATCHEWAN
20 FEBRUARY 1986

BRIEF NUMBER: 86-C60008 (Accident)
LOCAL TIME: 1730 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,660 | 1,024 |
| LAST 90 DAYS | 256 | 151 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

After take-off, the landing gear handle did not return to the neutral position following the selection. The pilot selected the gear down; however, it did not extend. He then tried the emergency system, and, although he was able to hand-pump the main gear down, the nose gear would not lock down. The aircraft was landed on the main wheels, and, during the landing roll, the nose gear collapsed.

A large crack was found in a hydraulic hose in the left main gear extension system. This crack permitted hydraulic fluid to escape before sufficient pressure could be developed to extend and lock down the nose gear. This hose serviced both the main and emergency landing gear systems.

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## DAUPHIN AIR SERVICE
## HELIO COURIER H-250 C-GRRU
## LAKE MANITOBA NARROWS, MANITOBA
## 22 FEBRUARY 1986

**BRIEF NUMBER: 86-C60013 (Accident)**
**LOCAL TIME: 1315 CST**
**OPERATION: Charter**
**DAMAGE: Substantial**
**PILOT LICENCE: Commercial**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 21,000 | 6,000 |
| LAST 90 DAYS | 250 | 250 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The ski/wheel equipped aircraft touched down normally on a frozen lake. As the aircraft turned left to taxi to shore, the left gear leg broke. The aircraft was travelling at very slow speed, and damage was confined to the gear leg and left wing tip.

The gear leg had failed because of crack propagation in the area of a factory weld. Subsequent dye penetrant inspection of the right gear leg revealed a one-quarter-inch crack at the base of the corresponding weld. Because of the location of the cracks, it would be difficult to detect them visually.

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## PIPER PA-28-151 CHEROKEE C-GPXV
## KING CITY AIRPORT, ONTARIO
## 23 FEBRUARY 1986

**REPORT NUMBER: 86-O/60008 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 0306 EST**
**OPERATION: Private Recreational**
**DAMAGE: Substantial**
**PILOT LICENCE: Commercial**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,800 | 150 |
| LAST 90 DAYS | 40 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft, with a pilot and passenger aboard, was on a night visual flight rules (VFR) flight from North Bay to King City, Ontario. Upon arriving at the airport in King City, the pilot circled the airport before landing the aircraft on the unlit runway. The aircraft landed well down the runway, and, when the pilot applied the brakes, he found the braking poor and directional control difficult to maintain. The aircraft overran the remaining runway and rolled across the road beyond the airport boundary. The nose gear failed backwards when it entered a snow-covered ditch on the far side of the road. The aircraft came to rest in a nose-low attitude, with the nose section resting against a snowbank.

The runway designation at King City Airport is 16/34, and its dimensions are 1,960 feet long by 50 feet wide. At the time of the accident, the runway surface was covered with scattered ice patches and compacted snow.

Runway lights, although provided, were not operating when the aircraft landed. Airport personnel reported that the runway lights are selected on only when they are notified that an aircraft is intending to land at the airport.

The pilot reported that he flew over at least one third of the runway before touching down. Since the length of the runway is 1,960 feet, the aircraft would have touched down approximately 650 feet from the threshold.

The aircraft received substantial damage to the nose gear, lower engine cowlings, firewall, and the propeller as a result of the nose gear failing after entering the roadside ditch.

The ELT did not activate because of the shock dampening effect of the snowbank and the slow speed of the aircraft at the time of impact.

The pilot flew the aircraft over the airport to determine the runway location before commencing his approach. The runway lights were not selected on, nor had airport personnel been notified ahead of time to turn them on for this flight. Without the runway lights in operation, it would have been difficult for the pilot to determine the exact location of the runway threshold, in order to carry out a landing just beyond the threshold.

When the aircraft landed, its touchdown point was at least 650 feet beyond the threshold. As the runway surface was covered with ice patches and compacted snow, the aircraft's ability to stop safely on the remaining runway was decreased.

***FINDINGS:***

**Cause Related:**
1. The pilot did not notify the airport of his arrival, and therefore the runway lights were not turned on.

2. The aircraft flew over one-third of the runway before touching down, and the runway remaining was not sufficient to safely stop the aircraft.

3. The runway surface was covered with patches of ice and compacted snow which contributed to poor braking action.

4. When the aircraft overran the end of the runway, it entered a ditch, causing the nose gear to fail.

**Other:**
-Nil-

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PATTISON INDUSTRIES
DE HAVILLAND DHC-3 OTTER C-FRHW
HEPLA LAKE, BRITISH COLUMBIA
04 MARCH 1986

REPORT NUMBER: 86-P60008 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1140 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 8,478 | 900 |
| LAST 90 DAYS | 124 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot took off from a lake and was climbing through 200 feet when the aircraft's engine (Pratt & Whitney R-1340 S3H1) started to lose power and backfire. The power output continued to drop; so the pilot closed the throttle and landed the aircraft on the lake surface that remained ahead. At the end of the lake, the aircraft's wing struck a tree, the aircraft veered right into the trees and struck a stump on the shore.

The lake was about one and one-half miles long and had been used safely by this and other pilots in the past. The weather was good, and the wind favoured the chosen take-off direction.

When the aircraft's engine lost power, the aircraft was not high enough to allow the pilot to turn back to the longer landing surface, and there was insufficient distance ahead in which to stop the aircraft.

The engine's number eight cylinder had cracked from one spark plug port to the other, causing the power loss. The cylinder failed in fatigue. The engine had been in service 877.6 hours since overhaul.

The following laboratory report was completed: LP 81/86 - Cylinder Failure Analysis DH3 - Otter C-FRHW.

***FINDINGS:***

**Cause Related:**
1. The aircraft's engine lost power due to a fatigue failure of the number eight cylinder.

**Other:**
-Nil-

PRAIRIE FLYING SERVICE
CESSNA A185F SKYWAGON C-GJOW
NEILBURG, SASKATCHEWAN
04 MARCH 1986

BRIEF NUMBER: 86-C60014 (Accident)
LOCAL TIME: 1225 CST
OPERATION: Contract
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10,856 | 7,000 |
| LAST 90 DAYS | 164 | 164 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

After take-off, the engine lost and subsequently regained power. The pilot continued the flight; however, en route, suspecting the engine was not performing satisfactorily, he decided to divert to a small gravel landing strip. During the approach to the airfield, the engine lost all power, and the aircraft struck a snowbank at the side of the runway, tearing off the right wheel-ski assembly. At this point, the engine regained power, and the pilot continued with the landing.

On touchdown, the aircraft rotated through 180 degrees and skidded backwards into another snowbank. The pilot examined the fuel and found it to be free of contaminants. The engine and fuel system were inspected and found to be serviceable, and a test flight confirmed the findings.

LEN'S FLYING SCHOOL
CESSNA U206 STATIONAIR C-FSGX
THOMPSON AIRPORT, MANITOBA
06 MARCH 1986

BRIEF NUMBER: 86-C60015 (Accident)
LOCAL TIME: 1056 CST
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,062 | 1,170 |
| LAST 90 DAYS | 155 | 155 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was attempting to land on the button of the runway. Initially, the approach was steep, and power was reduced to idle. Approximately 60 feet above the ground, the aircraft developed a rapid sink rate, and the throttle was advanced to reduce the rate of descent. The engine did not respond, and the aircraft landed in a nose-high attitude in lightly packed snow short of the runway. The nose gear and propeller were damaged.

There was no cross-wind, but there were gusts to 15 knots. The temperature was minus 25 degrees Celsius.

RISK OF COLLISION BETWEEN: PIPER PA-44 SEMINOLE C-GDNC and BOEING 727 FLIGHT 781
CALGARY INTERNATIONAL AIRPORT, ALBERTA
07 MARCH 1986

LOCAL TIME: 1606 MDT
INFORMATION SOURCE: Field Investigation

BOEING 727 FLIGHT 781
REPORT NUMBER: 86-W64010 (Incident)
OPERATOR: Western Airlines
OPERATION: Scheduled International
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 9 |
| PASSENGERS | - | - | 104 |

PIPER PA-44 SEMINOLE C-GDNC
REPORT NUMBER: 86-W64010 (Incident)
OPERATOR: Cheyenne Flight Services Ltd.
OPERATION: Commercial Non-Revenue
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,000 | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *HISTORY OF THE FLIGHT:*

A PA-23 aircraft departed runway 34 on an instrument flight rules (IFR) flight and was south of the airport before the incident PA-44 departed. The pilot of the PA-44, also on an IFR flight plan, took off from runway 34 and was instructed by the departure controller to climb to 6,000 feet above sea level (asl) and to maintain runway heading. The pilot acknowledged the clearance. When the PA-44 passed the intersection of runway 28/34, a Boeing 727 was cleared for take-off on runway 28.

Forty-five seconds later, the departure controller instructed the pilot of the PA-23 to turn left to a heading of 130 degrees. This clearance was acknowledged by the pilot of the PA-44, and the pilot then turned the aircraft. Fifty-two seconds later, the controller noticed a potential conflict between the PA-44 and the Boeing 727 and instructed the PA-44 to turn to a heading of 340 degrees.

Two pilots from Cheyenne Flight Services had flown earlier in the day to Calgary from High River in the PA-23. The pilot who occupied the right seat and handled the radio communications in the PA-23 for the flight to Calgary flew the PA-44 for the return flight to High River.

In the incident flight, the PA-44 pilot acknowledged the clearance with his call sign in letters rather than the required phonetics. The controller did not notice that the wrong aircraft had acknowledged the instructions until the PA-44 was turning. The pilot of the PA-23 heard the clearance and heard the other pilot acknowledge it, but did not query the exchange.

The PA-44 was at an estimated altitude of 5,700 feet asl, and the 727 was above 4,000 but under 5,200 feet asl when the two aircraft passed within one mile of each other. The targets merged, and it was difficult to determine how close the aircraft were to to each other on the recorded radar information.

The terminal unit at Calgary is not equipped with Joint En Route Terminal System (JETS) type radar that displays altitude and airspeed information.

The weather was measured ceiling 600 feet overcast, visibility four miles in haze, temperature minus four degrees Celsius, dew point minus seven degrees Celsius, and the wind was from 080 degrees at nine knots.

### *ANALYSIS:*

The IFR weather conditions and the fact that the incident pilot had been flying the PA-23 earlier in the day may have contributed to his following instructions given to the PA-23.

The traffic situation and the fact that the controller was not looking at the radar target for the PA-44 may explain why the controller did not realize that the wrong aircraft had acknowledged the clearance.

### *FINDINGS:*

**Cause Related:**

1. The pilot of the PA-44 acknowledged and followed instructions issued for the PA-23.

2. The pilot of the PA-23 did not question the controller when the pilot of another aircraft acknowledged his clearance.

3. The controller did not immediately realize that the wrong aircraft had acknowledged the instructions for the PA-23.

**Other:**
1. The pilot of the PA-44 did not use the phonetic alphabet for his call sign on his radio transmissions.

## LA TUQUE AIR SERVICES LTD
## PIPER PA 23-250 C-GOVW
## LA TUQUE, QUEBEC
## 11 MARCH 1986

BRIEF NUMBER: 86-Q60008 (Accident)
LOCAL TIME: 1560 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,950 | 1,500 |
| LAST 90 DAYS | 30 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

Because of a labour dispute between the municipality and its blue-collar workers, only a 20- to 30-foot-wide section of the La Tuque runway was cleared of snow. There were 30-inch-high snowbanks on either side. The wind was from the north at about 25 knots. The pilot was unable to make a half-turn with the aircraft on the ice and decided to take off to the south, with a tail wind. During the take-off run, the left wheel struck a snowbank, and the aircraft swerved to the left then headed for the deep snow. The pilot shut down both engines. The nosewheel collapsed, and the aircraft came to a stop about 400 feet further on.

## PIKANGIKUM AIR SERVICES LTD.
## CESSNA 185 SKYWAGON C-GEHJ
## PIKANGIKUM, ONTARIO 20 mi E
## 31 MARCH 1986

BRIEF NUMBER: 86-C60022 (Accident)
LOCAL TIME: 1615 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

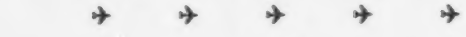
| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,400 | 3,000 |
| LAST 90 DAYS | 210 | 210 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot of the ski-equipped aircraft encountered lowering cloud, heavy rain, and ice-fog and decided to land on a nearby lake to wait for the weather to improve. The aircraft bounced on touchdown, but because of high ground at the end of the lake, the pilot did not conduct an overshoot. The aircraft slid into trees at the edge of the lake.

The weather forecast had included light rain, light rain showers, fog, and isolated moderate rain with extensive low ceilings forming in the precipitation.



## AERO-NORTH AVIATION SERVICES
## CESSNA A185F SKYWAGON C-GYGL
## SPRECKLEY LAKE, SASKATCHEWAN
## 31 MARCH 1986

BRIEF NUMBER: 86-C60023 (Accident)
LOCAL TIME: 1600 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,500 | 1,100 |
| LAST 90 DAYS | 20 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot landed the ski-equipped aircraft in deep snow that covered the ice on a lake. After a landing run of about 50 feet, the right gear leg failed, and the aircraft nosed over.

The gear leg failed at the ski axle attachment bolt holes. The area had been weakened by a pre-crack and failed in an overload manner on landing.

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EASTERN FLYING SERVICES
PIPER PA-31 NAVAJO C-GMHV
ST. LEONARD, NEW BRUNSWICK
11 APRIL 1986

REPORT NUMBER: 86-A60010 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0810 AST
OPERATION: Contract
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 2,200 | 500 | 2,100 | 500 |
| LAST 90 DAYS | 240 | 240 | 240 | 240 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

*HISTORY OF THE FLIGHT:*

The courier flight departed Halifax, Nova Scotia at 0600 Atlantic standard time (AST) for St. Leonard, New Brunswick. After two en route stops, the captain carried out a non-directional beacon (NDB) approach at St. Leonard. The airport became visual as the aircraft passed over the beacon on final, and the captain selected the gear down and continued for a landing. The aircraft landed on the runway with the gear up and slid to a stop on its belly.

*PERTINENT INFORMATION:*

To select the gear down in the PA-31, the gear handle must be pulled aft over a post and then pushed down with a positive motion. When the gear cycles down, three green lights come on as the secondary indication of a safe landing gear. If the landing gear is fully extended, the handle moves to the neutral position. This is the primary indication that the landing gear is down, and, until this movement occurs, the gear is considered unsafe, even if the three green lights are on.

A cockpit check-list could not be found during the investigation. The landing gear warning horn was found to be unserviceable; this fact was not recorded in the aircraft logbook. The emergency exit was sealed with a sealant and tape and was not usable.

The crew's daily work schedule required them to be on duty in Halifax at 0500 AST and to go off duty in Halifax at about 2015 AST, with a layover in St. Leonard from about 0815 to 1600 AST; a hotel room was provided for the layover. Both pilots had approximately four hours sleep prior to leaving Halifax. The captain had not eaten breakfast.

*ANALYSIS:*

Evidence indicates that the captain did not make a positive down-stroke when he selected the landing gear down. When he completed his pre-landing check, the handle was in the neutral position, and, seeing this, the captain did not check the light indicators. Crew coordination was somewhat casual, indicated by the fact that the co-pilot did not detect the error. The crew said that they normally use a check-list, even though one was not found in the aircraft.

The schedule required by this flying job leads to a broken work and social life and irregular sleep patterns; this can disrupt the human system, possibly causing long-term fatigue that may have contributed to cockpit inattentiveness.

Had the landing gear warning horn been functioning normally, it may have alerted the crew at the last minute and caused them to overshoot.

The fact that the emergency exit was sealed could have had serious consequences if the accident had necessitated the use of that exit.

*FINDINGS:*

**Cause Related:**
1. The aircraft was landed with the gear up because the gear-down selection was not made properly.

2. The way in which the crew coordinated with each other permitted the error in the landing gear selection to go undetected.

3. The landing gear warning horn was unserviceable.

**Other:**
1. The emergency exit was sealed and was not usable.

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## NIPAWIN AIR SERVICE LTD.
## CESSNA A185F C-GZWR
## STANLEY MISSION, SASKATCHEWAN 25 mi NW
## 18 APRIL 1986

REPORT NUMBER: 86-C60029 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1700 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 988 | 830 |
| LAST 90 DAYS | 75 | 75 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

Upon arrival over a remote northern lake, the pilot of the ski-equipped aircraft assessed the ice surface of the lake for visible hazards and selected an area and direction in which to land. Following touchdown, the right landing gear collapsed, and the aircraft came to rest supported by the right wing tip, the left landing gear, and the tail ski.

The right landing gear attachment bracket (Cessna part number 0713495-62) had been weakened by fatigue cracking, and, during the landing run, when the skis struck an ice ridge, the bracket failed. The Nipawin Air Service Maintenance Department, aware of the probability of failure of this part because of the increased stress imposed by ski operations, had instituted a 50-hour visual inspection of this part; this inspection is not required as frequently in the aircraft manufacturer's periodic inspection program.

***FINDINGS:***

**Cause Related:**
1. The right landing gear attachment bracket failed when the aircraft skis struck an ice ridge.

2. The bracket had been weakened by fatigue cracking.

**Other:**
1. Increased frequency of visual inspections, as conducted by Nipawin Air Service Maintenance Department, did not provide adequate monitoring of the landing gear attachment area to identify the development of fatigue cracking in time to take preventive action.

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## DE HAVILLAND DHC-2 C-GVQE
## LAC A LA TORTUE, QUEBEC
## 23 APRIL 1986

REPORT NUMBER: 86-Q60012 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1730 EST
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,650 | 1,300 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot, in preparation for ferrying the aircraft to its operating base following extended storage and a major engine modification, carried out a thorough run-up. The aircraft then took off and, during the climb to cruise altitude, at 1,400 feet above the ground, the engine misfired and lost power. The pilot immediately turned back towards the departure lake, simultaneously attempting, without success, to regain engine power. The aircraft struck two sets of power lines and crashed on the beach 150 feet short of the edge of the lake. The emergency locator transmitter (ELT) did not activate.

The aircraft had not been flown for approximately six months. During that time, optional Pratt & Whitney Service Bulletin, Number 1658, modification was incorporated in the aircraft engine (Pratt & Whitney R 985-14B). This modification involves a change to the main collector drive cage assembly. A slot has to be machined in the rear end of part no. 47913 cage assembly in order to create a new oil passage. The worked assembly is then reidentified as part no. 97927. Laboratory analysis of the engine rear case assembly established that the engine was equipped with an unmodified instead of a modified assembly.

The interchange of parts took place and went undetected at the overhaul facility. The unmodified part led to oil starvation of the impeller bearing, which subsequently collapsed and contaminated the entire engine with metal from the desintegrating impeller and its case.

Laboratory examination of the ELT determined that this transmitter did not trigger because of a faulty inertia switch.

The wires struck by the aircraft slowed the aircraft down and pulled it to the ground.

The following laboratory report was completed: LP 104/86 - Engine Rear Case Assembly Examination DHC-2, C-GVQE.

*FINDINGS:*

**Cause Related:**
1. An unmodified main collector drive cage assembly was installed in the engine instead of the cage assembly which was called for in the service bulletin.

2. The interchange of parts went undetected at the overhaul facility.

3. The engine lost power because the unmodified part led to oil starvation of the impeller bearing, which subsequently failed.

4. During the forced landing attempt, the aircraft struck power lines, and the aircraft crashed on a beach.

**Other:**
1. The ELT failed to function because of a faulty inertia switch.

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NORTHWAY AVIATION
CESSNA 180 SKYWAGON CF-HKB
BLOODVEIN RIVER AIRPORT, MANITOBA
01 MAY 1986

BRIEF NUMBER: 86-C60033 (Accident)
LOCAL TIME: 1515 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 983 | 5 |
| LAST 90 DAYS | 53 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*REPORTED CIRCUMSTANCES:*

The aircraft landed on runway 36 at Bloodvein River, Manitoba. The aircraft touched down normally; however, once the tail wheel came in contact with the runway, directional control could not be maintained. The aircraft ground looped, coming to rest off the runway in an upright position. The surface wind was from 310 degrees at 10 to 15 mph.

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EAR FALLS AIRWAYS
NORDYNE NORSEMAN MK IV C-FFQX
RED LAKE, ONTARIO
29 MAY 1986

BRIEF NUMBER: 86-C60043 (Accident)
LOCAL TIME: 1740 CDT
OPERATION: Commerical Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,400 | 500 |
| LAST 90 DAYS | 50 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The float-equipped aircraft was taxiing downwind on Red Lake for an intended flight to Ear Falls. Without warning, a violent wind raised the aircraft's tail section,

which caused the aircraft to nose down, roll left, and eventually come to rest in an inverted position in the water.

A 40,000-acre fire 15 miles northwest of Red Lake was producing severe weather in the area. Violent winds, near tornado strength, were evident at the time of the occurrence.

HUGHES AIR ALBERTA LIMITED
CESSNA R182 C-GLYJ
CANMORE, ALBERTA 14 mi SE
06 JUNE 1986

REPORT NUMBER 86-W60015

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,873 | 53 |
| LAST 90 DAYS | 186 | 41 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

### *HISTORY OF THE FLIGHT*

On 06 June 1986, at 0841 mountain daylight time (MDT), the aircraft, a Cessna R182, C-GLYJ, with a pilot and one wildlife biologist on board, departed Springbank on a two- to three-hour bighorn Rocky Mountain sheep survey in the Kananaskis area. The aircraft failed to return from the survey, and the last recorded communication with it was at 0848 when it cleared the Springbank control area to the west.

An air and ground search located the downed aircraft on Mount Kidd on 18 June 1986. It had struck a mountain ridge at the 7,160-foot level and burst into flames. The ridge peak is 7,300 feet above sea level (asl). The aircraft then fell down a 300-foot cliff and came to rest on a narrow ledge, concealed behind a stand of trees, where it was consumed by the post-crash fire. The initial impact occurred on a westerly heading, parallel to the ridge, while the aircraft was flying toward rapidly rising terrain. Both occupants were fatally injured.

The accident occurred at lat 50°53'N, long 115°14'W during the hours of daylight, at an elevation of 7,160 feet asl.

### *ANALYSIS*

The investigation attempted to determine why the aircraft struck the mountain ridge. Upon departure, the aircraft was deemed to be serviceable, the pilot was qualified, and he had carried out several other game surveys in the same area, using the same aircraft.

### *FINDINGS*

**Cause-Related Findings**
1.The cause of the accident could not be determined.

**Other Findings**
-Nil-

### *SAFETY ACTION*

The Board has no safety recommendations to issue at this time.

AEROCLUB DE ST-MATHIEU
BELOEIL AIRPORT, QUÉBEC
CESSNA 172M C-GUFO
08 JUNE 1986

BRIEF NUMBER: 86-Q60019 (Accident)
LOCAL TIME: 1830 EDT
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Commercial

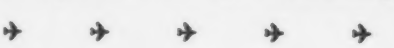
| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 450 | 200 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

### *REPORTED CIRCUMSTANCES:*

The pilot landed the aircraft on runway 33 which was 2,200 feet long and 50 feet wide. He lost control during the landing roll; the aircraft left the runway to the right and came to rest in a ditch at the side of the runway.

The wind was from 285 degrees at 20 gusting to 28 knots, and the pilot used full flaps for the landing.



ROLAND AIRSPRAY LTD.
PIPER PA-25-260 PAWNEE C-GSYI
WEYBURN, SASKATCHEWAN
11 JUNE 1986

BRIEF NUMBER: 86-C60046 (Accident)
LOCAL TIME: 0800 CDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,100 | 250 |
| LAST 90 DAYS | 100 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

Returning to the private airstrip owned by the the airspray company, the pilot landed on a narrow runway leading into the mixing and storage area. The landing was attempted with a cross-wind from the left at 15 to 20 knots, and the pilot flew the approach using a cross-wind technique. During the landing roll, the pilot lost directional control, and the aircraft veered left into an adjacent summer fallow field where it nosed over.

The pilot attempted to re-establish directional control by using right brake, but the left main wheel contacted soft ground bordering the runway, and the aircraft veered left.

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AGRIC AIR INC.
AYRES S2R 600 C-GSOP
METEOR LAKE, ONTARIO
15 JUNE 1986

REPORT NUMBER: 86-O/60049 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0725 EDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,700 | 50 |
| LAST 90 DAYS | 110 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The aircraft departed Garvey Airstrip, Ontario, with one other Ayres S2R and a Cessna 172 for a forestry spray operation. Approximately three quarters of the way through the spray runs, the pilot noticed that the engine was lacking power, although all temperatures and pressures were normal. The pilot applied carburettor heat, but this failed to make any appreciable improvement in engine performance. He then backfired the engine three times in an attempt to clear any possible carburettor ice, but again this had no appreciable effect. The pilot discontinued the spray operation and turned towards base. Approximately two minutes into the return trip, the engine lost power. Attempts to restart the engine were unsuccessful, and a forced landing was carried out in a bog. The aircraft touched down normally and then nosed over. The canopy became submerged in the bog, and the pilot was unable to remove the doors and get out of the aircraft. He broke the canopy window out piece by piece and managed to squeeze through the broken window. It took the pilot four minutes to free himself.

Examination of the engine revealed that the push rod for the number seven cylinder exhaust valve had fractured. The rod ends remained in contact because of the shroud tube, and the valve continued to operate; however, the continued pounding of the fracture surfaces caused the aluminum rod to progressively shorten until the valve no longer opened. This condition caused a loss of power to the extent that the pilot thought he had a total engine failure. Continued operation of the engine caused the fracture faces of the rods to be flattened, so that it was impossible to determine the mode of failure.

There was no suitable landing area available to the pilot, and the aircraft nosed over when it touched down in the bog.

***FINDINGS:***

**Cause Related:**
1. The push rod for the number seven cylinder exhaust valve failed for undetermined reasons.

2. The failure of the exhaust valve push rod greatly reduced the engine power output and flight could not be continued.

3. No suitable landing area was available, and the aircraft nosed over when it touched down in the bog.

**Other:**
-Nil-

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## NORTHERN AIR APPLICATORS
## PIPER-PA-25-235 PAWNEE C-GZCH
## CENTRAL BUTTE, SASKATCHEWAN 6 mi W
## 18 JUNE 1986

**BRIEF NUMBER: 86-C60047 (Accident)**
**LOCAL TIME: 2100 CDT**
**OPERATION: Specialty Aerial Application and Distribution**
**DAMAGE: Substantial**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,000 | 1,800 |
| LAST 90 DAYS | 40 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was spraying a field with chemicals and was turning at the end of a spray run when the engine lost power. During the ensuing forced landing, the aircraft landed hard, and the landing gear collapsed.

The engine had stopped because of fuel exhaustion.

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## PRAIRIE AIR SERVICES LTD.
## CESSNA A188B AGWAGON C-GJDG
## FROUDE, SASKATCHEWAN 3 mi E
## 21 JUNE 1986

**REPORT NUMBER: 86-C60051 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 2000 CST**
**OPERATION: Specialty Aerial Application and Distribution**
**DAMAGE: Substantial**
**PILOT LICENCE: Commercial**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,300 | 150 |
| LAST 90 DAYS | 250 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot had completed seven spray runs and was in a procedure turn at an altitude of 50 feet when the engine lost power. The pilot levelled the wings and attempted a forced landing straight ahead. The aircraft struck the edge of the road bordering the field being sprayed, and the landing gear collapsed. The aircraft went through a fence and continued a further 100 feet before coming to rest in an adjoining field. The pilot suffered minor pelvis and neck injuries.

The bolt that attaches the throttle control cable to the throttle arm had failed, and the throttle pull-open spring was missing. The throttle pull-open spring automatically pulls the throttle to the full-open position in the event of throttle control failure. It is not known for how long this spring had been missing. The throttle arm bolt hole showed extensive wear, indicating that the bolts had been loose for some time. A thorough search of the engine compartment failed to turn up the missing bolt or spring.

The bolt that attached the throttle control to the throttle arm was insufficiently torqued. This allowed the bolt to vibrate and wear to a point where the bolt failed. The wear on the throttle arm and throttle control rod end bearing indicated that the bolt had been loose for sometime. Because this pull-open spring was missing, the throttle valve closed, and the engine went to low power. When the engine went to low power, the pilot was unable to maintain sufficient altitude to clear the road.

Several maintenance deficiencies were observed during the investigation.

1. The induction hose clamps on the number four cylinder were not fastened.

2. The oil cooler mounting bracket clamp was broken and was wearing on the engine mount cross number.

3. The number five exhaust pipe was cracked and had been leaking for sometime.

4. The tail wheel steering cables had been tied in a knot in an effort to increase their tension.

These deficiencies had no impact on the occurrence but indicate an inadequate level of maintenance.

***FINDINGS:***

**Cause Related:**
1. The throttle control attachment bolt failed.

2. The throttle pull-open spring was missing, which allowed the throttle valve to close, thus reducing the power.

**Other:**
1. The induction hose clamps on the number four cylinder had not been fastened.

2. The oil cooler mounting bracket clamp was broken and was wearing on the cross member.

3. The number five exhaust pipe was cracked.

4. The tail wheel steering cables had been tied in a knot in an effort to increase their tension.

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## ALERT AIRWAYS GROUP
## CESSNA A185E C-FXSR
## FORT MCMURRAY, ALBERTA 18 mi NE
## 30 JUNE 1986

REPORT NUMBER: 86-W60024 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1652 MDT
OPERATION: Specialty Aerial Inspection, Reconnaissance, and Advertising
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,200 | 100 |
| LAST 90 DAYS | 250 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The pilot, with a forestry official as passenger, was on a fire patrol in the float-equipped aircraft out of Fort McMurray, Alberta. The aircraft had been flying for approximately two hours, at an altitude of 3,500 feet agl, when the engine lost power as fuel was exhausted from the left tank. Adequate power could not be restored, and the pilot force-landed the aircraft in muskeg.

In an attempt to restore power, the pilot switched the fuel selector to the "both" position, and power was restored momentarily before the engine again lost power. The right tank was then selected, and the pilot noted that the fuel flow was seven gallons per hour. He then placed the auxiliary fuel pump switch to emergency. The engine continued to run unevenly and at low power. The auxiliary fuel pump was then switched off, and the mixture control was pushed into the rich position. No change was made to the throttle setting, which remained where it had been for cruise power. As the aircraft was losing both airspeed and altitude, and as power could not be restored, the pilot prepared for a forced landing. One lake, about five miles away, appeared to be within gliding distance. The pilot maintained an airspeed of 80 to 85 mph as he approached the lake, but it became apparent that he would undershoot by about one-quarter of a mile. Full flap was lowered just prior to touchdown, and the aircraft landed heavily in the muskeg.

The fuel system was checked, and no usable fuel was found in the left tank, but there was a considerable quantity in the right tank. The engine was started with the tank selector on the right tank, and the engine ran normally.

The owner's manual for this aircraft recognizes that a fuel tank may be completely exhausted in flight and gives a recommended procedure for restarting the engine. The auxiliary fuel pump should be switched on immediately and left in the emergency position for at least three to five seconds to ensure adequate fuel flow. The pilot did not switch the pump on immediately and did not leave it on long enough to purge the fuel lines of air.

*FINDINGS:*

**Cause Related:**
1. The engine lost power because of fuel starvation.

2. The recommended procedure to restart the engine was not followed.

3. The engine would not produce normal power because of inadequate fuel flow and the presence of air in the fuel line.

**Other:**
-Nil-

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HOLME AVIATION LTD.
PIPER PA-36-300 BRAVE C-GJZU
ILE DES CHÊNES, MANITOBA 2 mi E
09 JULY 1986

REPORT NUMBER: 86-C60062 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1410 CDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,800 | 120 |
| LAST 90 DAYS | 60 | 07 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot took off from a private grass strip to conduct an aerial spray operation. After lift-off, the aircraft did not climb as expected, and, in order to avoid trees at the far end of the strip, the pilot pulled the aircraft up. After clearing the trees, the aircraft stalled and struck the ground.

The aircraft weight and centre of gravity were within the prescribed limits. The control system, engine and components were examined, and no pre-impact problems were found. It was a clear day with calm winds, high temperatures, and high humidity.

The stalling speeds posted for this aircraft are 58 and 69 mph for take-off weights of 3,100 and 4,400 pounds respectively. The aircraft weighed approximately 4,100 pounds at take-off and became airborne half-way along the strip at a speed of 60 miles per hour.

The pilot had completed a flight from the same strip and with the same load some 50 minutes earlier, and the aircraft had cleared the trees at the far end of the strip by 10 to 20 feet.

The high temperature and humidity resulted in a high density altitude which reduced the aircraft's take-off and climb performance. The aircraft became airborne prematurely at a speed near the stalling point. After lift-off, there was insufficient distance remaining to build up speed to clear the trees safely and when the pilot pulled up to clear the trees, the aircraft stalled, and struck the ground.

***CONCLUSIONS:***

**Findings:**
1. The aircraft became airborne prematurely at a speed near the stall.

2. After take-off there was insufficient distance for the aircraft to clear the trees at the end of the runway.

3. The aircraft stalled and struck the ground, when the pilot pulled up to clear the trees at the end of the runway.

**Causes:**
The aircraft became airborne prematurely and with insufficient distance remaining to safely clear trees at the end of the runway.

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MISHAIR INC.
CESSNA A188B AGWAGON C-GSMY
RADVILLE, SASKATCHEWAN
09 JULY 1986

BRIEF NUMBER: 86-C60061 (Accident)
LOCAL TIME: 0703 CST
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,350 | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was taking off in a northerly direction on a flight for the purpose of spraying crops in the local area. After take-off, the climb was shallow, and the landing gear struck the shoulder of a grid road about 100 feet from the end of the runway. The aircraft came to rest in a field of grain about 300 feet beyond the road.

Good visual meteorological conditions prevailed, but the wind, although not strong, was extremely variable. Winds in the surrounding area were generally east-southeast at 7 to 10 knots. Prior to take-off, the pilot noted the wind direction as being from the northeast.

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## KNOX AERIAL SPRAYING LTD
## PIPER PA-25-235 PAWNEE C-GYWW
## GLENBORO, MANITOBA 1 1/2 mi SE
## 19 JULY 1986

REPORT NUMBER: 86-C60070 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0830 CDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Destroyed
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,000 | 150 |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

### *HISTORY OF THE FLIGHT:*

The aircraft was on the second spray flight of the day. The pilot commenced the run from west to east following the pattern established on the first flight. On completion of the run, the pilot pulled up and commenced a right turn, and the left wing and the projecting spray boom struck the upper branches of a row of trees. The aircraft rolled left over the trees and plunged in an inverted attitude into a field. The pilot was killed in the crash and the aircraft burned.

### *PERTINENT INFORMATION:*

The aircraft's weight and balance were within the prescribed limits. The airframe, the engine, and the control systems were examined; no problems were found. The damage to the propeller indicated that the engine was developing power on impact. Small branches, twigs, and leaves were found in the left spray boom and in parts of the left wing. The front attachment points for the boom hanger arms had fractured on striking the trees, allowing the boom to rotate upwards. The hangar arms had struck the left aileron causing damage to the bottom face of the leading edge, forward of the hinge line.

Modifications to the spray boom attachment components had been made in order to lower the spray boom at the outboard end, but formal approval had not been obtained.

An east/west spray run pattern had been previously established by the pilot, and there were no obstructions at the ends of these runs. The last run was in an easterly direction, into sun, and a line of trees 20 feet in height stood at the far end of the run.

### *ANALYSIS:*

The pilot had been spraying without obstructions at the end of each run. After refilling the aircraft with insecticide, the pilot took off and returned to the field and commenced the first spray run to the east. There was a row of trees at the end of the run, and the pilot did not pull up in time to avoid striking them. The left spray boom and the left wing struck the tree-tops, causing the boom hanger arms to damage the left aileron and resulting in complete loss of control. The spray run was made into the sun, and this may have restricted the pilot's vision.

### *CONCLUSIONS:*

**Findings:**
1. The pilot was flying into the sun, which may have restricted his vision.

2. The pilot did not pull up in time to prevent the left wing striking a row of trees, damaging the left aileron and resulting in a complete loss of control.

3. Modifications had been made to the spray boom attachment components, but formal approval had not been obtained.

**Causes:**
The pilot did not pull up in time to avoid striking a row of trees.

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## DAUPHIN AIR SERVICES LTD.
## PIPER PA-25 PAWNEE C-GYXF
## DAUPHIN, MANITOBA 5 mi E
## 19 JULY 1986

BRIEF NUMBER: 86-C60069 (Accident)
LOCAL TIME: 1430 CDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,700 | 23 |
| LAST 90 DAYS | 170 | 23 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was undergoing training in aerial application and was spraying a crop. He had completed his fourth swath run and was pulling up when the left main gear struck a power pole. The gear separated from the aircraft; the pilot flew back to the airport where he landed the aircraft on the remaining main wheel. The aircraft sustained additional damage during the landing.

The pilot had completed two runs before his flagman arrived on the site. The pilot was attempting to hand-signal the flagman as he was pulling up from the run, and he became distracted.

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LEN'S FLYING SCHOOL
CESSNA 172N C-GGBP
NEULTIN LAKE, MANITOBA
20 JULY 1986

BRIEF NUMBER: 86-C60071 (Accident)
LOCAL TIME: 0945 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 900 | 200 |
| LAST 90 DAYS | 300 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The aircraft was chartered to fly a passenger from a northern airstrip to Thompson, Manitoba. Shortly after take-off, the engine lost all power, and the pilot force-landed into rough, treed terrain off the end of the runway.

The pilot had just completed a flight of nearly two hours duration without difficulty and, prior to the accident flight, had refuelled the aircraft at Neultin Lake from a partially full barrel. After refuelling, he checked the wing tanks and fuel pump for water contamination, and none was found. Following the crash, the carburettor float drain was checked, and, when the drain plug was removed, the first four to six ounces of escaping fluid was water.

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KINNIBURG SPRAY SERVICE
GRUMMAN G164A AG-CAT C-FFMV
LETHBRIDGE AIRPORT, ALBERTA 3 mi SE
22 JULY 1986

REPORT NUMBER: 86-W60033 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1020 MDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,750 | 100 |
| LAST 90 DAYS | 250 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot took off from runway 12 at Lethbridge Airport on his third flight of the day. On board was a full load of chemical. About three miles from the airport, the aircraft entered a rain shower and descended to the ground. The right main wheel broke off as the aircraft went through a shallow irrigation ditch. The right gear leg then dug into the ground, and the aircraft swung around to the opposite direction. The pilot had jettisoned the load just prior to touching down.

The aircraft was en route to the work area, flying at approximately 100 feet above ground level (agl), when it entered a rain shower and started to lose altitude. The pilot maintained full-aft elevator control throughout the few seconds that it took for the aircraft to strike the ground in a three-point attitude. The engine was producing full power and was running at 30 inches of manifold pressure until after ground impact.

Weight and balance calculations for the load placed the centre of gravity within the range specified for the aircraft at its maximum gross weight of 4,500 pounds, but showed the load to be nearly 1,300 pounds over this maximum.

When the overloaded aircraft passed through the rain shower, it encountered subsiding air. A head wind changed to a tail wind, causing a sudden decrease in airspeed and a loss of altitude. The aircraft struck the ground before the pilot could regain control.

***FINDINGS:***

**Cause Related:**
1. The performance of the aircraft was adversely affected by the overload condition.

2. The aircraft was forced to descend when it entered a rain shower and encountered subsiding air.

3. The aircraft was being flown at too low an altitude to effect a recovery.

**Other:**
-Nil-

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VIRDEN AVIATION
CESSNA A188B AGWAGON C-GRGL
WASKADA, MANITOBA 4 mi N
22 JULY 1986

BRIEF NUMBER: 86-C60072 (Accident)
LOCAL TIME: 2100 CDT
OPERATION: Specialty Aerial Application
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,100 | 1,600 |
| LAST 90 DAYS | 110 | 72 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was taking off from a 1,500-foot grass strip to conduct an aerial spray operation. The aircraft became airborne but could not clear a grain crop at the end of the runway. The wheels contacted the crop, and the aircraft nosed down and struck the ground.

The winds were light, and the temperature was 23 degrees Celsius. The take-off weight was near the maximum allowable. The pilot made his decision regarding take-off performance on the basis of his experience; he did not use performance charts. The performance charts in the aircraft manual do not provide adequate information regarding non-standard conditions. Supplemental performance information is available, but there is no requirement for operators to obtain or use it.

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CAMROSE FLYING SERVICE LIMITED
CESSNA 177 CARDINAL C-GEIY
CAMROSE AIRPORT, ALBERTA 2 mi NW
26 JULY 1986

REPORT NUMBER: 86-W60036 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1110 MDT
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 66 | 5 |
| LAST 90 DAYS | 8 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 3 | - |

***SUMMARY REPORT:***

The pilot departed Camrose, Alberta on a flight to an area north of Edmonton. Approximately 1 hour and 40 minutes later, the aircraft returned to the Camrose Airport. During the turn onto final for runway 13, the engine lost all power, and a forced landing was carried out on a cultivated field. All the occupants sustained serious injuries.

Evidence at the accident site indicated that the aircraft contacted the ground in a stalled attitude. Only unusable fuel was found on board the aircraft and in the fuel system. Before flight, the pilot used a dipstick that was stored in the aircraft's glove compartment to determine the quantity of fuel on board. The fuel level indicated about three-quarters full, relative to the "full" line on the dipstick. It was determined that this dipstick was calibrated for a Cessna 150.

A functioning emergency locator transmitter (ELT) was installed in the aircraft and was activated by the impact. However, the antenna was found disconnected.

The aircraft was not equipped with shoulder harnesses, and both front-seat occupants struck the instrument panel with their heads.

The pilot had completed her flight training using a Cessna 150, and, after receiving her private licence, she began flying the Cessna Cardinal. Her training consisted of an oral walkaround briefing, followed by a 0.9-hour flight which did not include any flight maneouvres such as steep turns, slow flight, or stalls. The instructor and pilot did not practise emergency procedures, nor was this required by regulation. As well, existing regulations

do not require certification to a minimum level of competency for private pilots flying different aircraft types.

The engine lost all power when the available fuel was exhausted. The pilot had used a dipstick that was calibrated for a different aircraft type. The dipstick was not marked to identify it by aircraft registration or model. When used, it led the pilot to believe that there were about 37 U.S. gallons on board, when, in fact, there were about 19 U.S. gallons. The aircraft burned about 9.0 gallons per hour during cruise flight conditions.

The ELT antenna connector is designed so that it will not disconnect from the force of an impact. Although the impact triggered the ELT to transmit, without the antenna connected, it was effectively inoperative.

*FINDINGS:*

**Cause-Related:**
1. The engine lost all power because of fuel exhaustion.

2. The aircraft stalled when the pilot allowed the airspeed to decay.

3. The fuel dipstick used to determine the fuel quantity on board was calibrated for a different model aircraft and erroneously led the pilot to believe that the aircraft contained adequate fuel for the intended flight.

**Other:**
1. The ELT installation was not serviceable because the antenna was not connected.

2. The aircraft was not equipped with shoulder harnesses.

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## CESSNA 172N SKYHAWK C-GJQZ
## GILLAM, MANITOBA 2 mi N
## 26 JULY 1986

REPORT NUMBER: 86-C60075 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1045 CDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 98 | 30 |
| LAST 90 DAYS | 7 | 7 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

*HISTORY OF THE FLIGHT:*

The pilot was doing touch-and-go landings in the Cessna 172 aircraft at Gillam Airport, Manitoba. He completed three right-hand circuits from runway 05, passing over the townsite each time. During these circuits, the aircraft was observed to be flying just under, and on occasion entering, the ragged cloud base. Following the third touch-and-go landing, the pilot reported that he would be completing a fourth circuit in a left-hand pattern.

The aircraft was then observed in a steep climbing turn to the left before it entered cloud. Moments later, the aircraft descended out of the cloud in a near vertical descent with the engine at a high power setting; the aircraft continued to descend until it struck the lake surface. The aircraft was destroyed, and the pilot received fatal injuries.

*PERTINENT INFORMATION:*

There was no evidence that the pilot was physically incapacitated He had 98 hours flying time, and there was no record of his having received any instrument flying training or having any experience of flying in cloud.

The aircraft's weight and balance were within the prescribed limits, and there was no evidence of any airframe or engine malfunction prior to the accident.

After impact, the aircraft sank immediately in water in which the visibility was near zero. Side-scanning sonar equipment was used to search for the wreckage, which was found five days after the accident. Recovery operations were completed in the following two days.

The wing, stabilizer, and elevator were more extensively damaged on the right side of the aircraft than on the left; all flight controls cables were intact. The engine was found capable of producing power, and the damage to the propeller was consistent with a high-speed, power-on impact. Witnesses confirmed that the engine was operating at a high power setting just before the impact.

Meteorological observations taken by the weather station at the airport 45 minutes before the accident reported overcast and ragged ceiling at 1,500 feet above ground level (agl); visibility 15 miles; temperature 13.2 degrees Celsius; and winds calm. Thirty minutes before the accident, the ceiling had lowered to 1,100 feet agl, and, 25 minutes after the accident, the ceiling was reported to be ragged at 800 feet agl, with the visibility 10 miles in very light drizzle and fog. The pilots of two aircraft searching for the wreckage immediately after the occurrence reported a ceiling of 400 feet above the surface of the lake.

The accident pilot had flown three right-hand circuits, which took the aircraft over land. Left-hand circuits from runway 05 take the aircraft over the lake.

*ANALYSIS:*

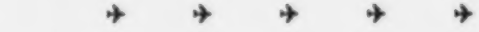
The aircraft descended at a steep angle and at high speed, with the engine developing considerable power. This, combined with the extensive damage to the right side of the aircraft, indicates that the aircraft came out of the cloud in a spiral dive.

The pilot had made three right-hand circuits over the land in visual flight rules (VFR) conditions, under a ceiling which was lowering. During these circuits, the aircraft was flying just under, and occasionally entering, the ragged cloud base. The left-hand circuit was over water where the ceiling was observed to be considerably lower. The pilot probably expected the ceiling over the water to be the same as that encountered while he was flying right-hand circuits over the land, and this caused him to enter the cloud unexpectedly. When this happened, the pilot became disoriented and lost control of the aircraft. When the aircraft broke out of the clouds, there was neither sufficient altitude nor time for the pilot to regain control.

*FINDINGS:*

**Cause Related:**
1. While flying a visual circuit, the pilot inadvertently entered cloud, became disoriented, and lost control of the aircraft.
2. The aircraft broke out of the cloud base in a spiral dive at too low an altitude for the pilot to effect a recovery.

**Other:**
-Nil-



## CESSNA 172M C-GEBS
## TROIS-PISTOLES, QUEBEC
## 27 JULY 1986

BRIEF NUMBER: 86-Q60036 (Accident)
LOCAL TIME: 1010 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 350 | 100 |
| LAST 90 DAYS | 14 | 7 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*REPORTED CIRCUMSTANCES:*

After landing on the grass strip, the pilot turned the aircraft to the left, toward an area that looked suitable for parking. The ground along the edge of the runway was covered with tall grass. The aircraft had just left the runway when the left wheel got stuck in a ploughed furrow. The pilot increased the power as soon as he felt the left side of the aircraft sink, and the aircraft nosed over.

## G.E.M. AG-SPRAY INC.
## GRUMMAN G164B AG-CAT C-GWJA
## DELMAS, SASKATCHEWAN 7 mi W
## 18 AUGUST 1986

BRIEF NUMBER: 86-C60082 (Accident)
LOCAL TIME: 2105 CST
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,700 | 380 |
| LAST 90 DAYS | 200 | 180 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was taking off from a stubble field. The aircraft did not become airborne in the distance available and overran into an adjacent field. The aircraft swung 90 degrees and skidded to a stop.

The take-off distance available was about 2,600 feet; the aircraft was loaded to capacity, the wind was calm, and the temperature was 28 degrees Celsius.

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## PARI AIR LTD.
## CESSNA A188B AGWAGON C-GZUP
## DOMREMY, SASKATCHEWAN 10 mi NE
## 21 AUGUST 1986

BRIEF NUMBER: 86-C60086 (Accident)
LOCAL TIME: 2000 CST
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 666 | 211 |
| LAST 90 DAYS | 167 | 166 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot took off from a grid road near the field to be sprayed. Immediately after lift-off, he turned to avoid trees and bushes at the end of the road. The aircraft struck a small bush, the left wing dropped, and the aircraft descended and struck the ground. It skidded for some distance and came to rest in an inverted position.

The grid road had about a four-degree upslope in the direction of take-off with trees and bushes about 2,500 feet from the departure point. The wind was calm, and the temperature was estimated at 21 degrees Celsius.

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## CESSNA 172N C-GMHU
## BURLINGTON AIRPARK, ONTARIO
## 24 AUGUST 1986

REPORT NUMBER: 86-O/60077 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1720 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 42 | 42 |
| LAST 90 DAYS | 42 | 42 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***SUMMARY REPORT:***

The aircraft returned to Burlington Airpark, Ontario, after a local flight. On final approach to runway 32, the pilot selected flaps down and maintained a 70-knot approach speed. On touchdown, the aircraft bounced, and the pilot decided to overshoot. He applied full power and selected flaps up. The aircraft veered left, started to climb, and then suddenly settled back onto the ground to the left of the runway. It travelled through the infield for 240 feet and through tall grass for an additional 350 feet, before striking a row of trees, where it came to rest.

There were clear skies and unlimited visibility, and the wind was 350 degrees magnetic at 14 knots.

The aircraft's landing weight and centre of gravity were within the specified limits.

Following the baulked landing, the pilot did not attempt to reduce engine power as the aircraft veered off the runway or as it travelled through the grass field.

The rear tie down ring attached to the underside of the tailplane was found broken and lying on the runway, in-

dicating that the aircraft was in a nose-high attitude on touchdown. Ahead of the indentation on the runway made by the impact of the ring, there were paint marks etched on the runway that matched the aircraft's colours, and the marks showed the aircraft's heading as it left the runway.

During the attempted lift-off, the pilot did not follow the manufacturer's recommended procedures for a baulked landing (go-around). The manufacturer suggests to apply full power and reduce the flap setting to 20 degrees. Raising the flaps to the full-up position, although reducing drag, also reduces lift and increases the stall speed. Initially, the aircraft started climbing but settled to the ground when the flaps were raised. The pilot was then unable to maintain directional control of the aircraft, and it veered off the runway.

*FINDINGS:*

**Cause Related:**
1. The touchdown was carried out in a nose-high attitude, and, as a result, the tail section struck the runway.

2. The pilot did not apply the manufacturer's recommended procedures following a baulked landing and lost directional control.

3. The pilot did not reduce power as the aircraft approached the trees.

**Other:**
-Nil-

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## CESSNA 210B CENTURION C-FOSB
## LAKE ERIE, ONTARIO
## 26 AUGUST 1986

REPORT NUMBER: 86-O/60078 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1618 EDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,063 | 600 |
| LAST 90 DAYS | 38 | 16 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

*HISTORY OF THE FLIGHT:*

The pilot and passenger departed Lost Nation Airport, Ohio on an instrument flight rules (IFR) flight to Brantford, Ontario. While in cloud at 5,000 feet above sea level (asl), the pilot encountered heavy turbulence and requested additional en route weather information. After being advised of a large area of severe weather in his vicinity, and based on the advice of the controller, the pilot deviated left of track. There was no further radio contact with the aircraft, and, 30 seconds later, at 1618 eastern daylight time (EDT), Cleveland Centre lost radar contact with the aircraft. The loss of radar contact occurred while the aircraft was still at altitude.

The following morning, a small amount of floating debris, identified as coming from C-FOSB, was recovered from Lake Erie, about four miles southeast of the last radar position of the aircraft. The bodies of the two occupants were not found.

*PERTINENT INFORMATION:*

Prior to departing Lost Nation Airport, the pilot telephoned Cleveland Flight Service to check the weather and file a visual flight rules (VFR) flight plan. He intended to leave immediately and fly VFR, eastbound, to avoid a fast-moving frontal weather system. During the weather briefing, the flight service attendant informed the pilot that VFR flight was not recommended because thunderstorms associated with this weather system were reported all over northern Ohio, and a tornado watch for this area was in effect. Cloud tops were reported up to 58,000 feet asl, with wind gusts to 70 knots and hail two and one-half inches in diameter. The flight service attendant informed the pilot that the leading edge of the weather system was already east of Lost Nation and that it would be difficult to stay ahead of the system. The pilot queried this information because he had just flown VFR from Erie, Pennsylvania without difficulty. He elected to file an IFR flight plan to fly north across Lake Erie. The flight plan was filed without consulting an IFR chart. The route was in proximity to the frontal system which was moving northeastward at 30 to 40 knots. Severe thunderstorms with heavy precipitation, turbulence, and lightning were associated with the system.

*ANALYSIS:*

When the pilot received this weather briefing over the telephone, he was told that the leading edge of the severe weather was already east of his location. Because he had received his weather briefing by telephone, he was not able to visually appreciate the progression of

the weather system which was very evident on the surface analysis charts and maps.

After receiving his weather briefing and after being advised that his plan to fly VFR eastbound was not advisable, the pilot elected to file an IFR flight plan; however, because he did not have an IFR navigational chart with him at the time, he chose the route across Lake Erie from memory. Had he consulted an IFR chart and been able to visually appreciate the progression and severity of the approaching weather system, the pilot would have realized that the route chosen for his flight was in proximity to, and parallel to, the fast-moving frontal system and associated severe weather.

When C-FOSB proceeded northeastward across Lake Erie at 5,000 feet asl, the pilot approached the area of intense thunderstorm activity. Since he was in cloud, he could not visually detect these embedded vertical development clouds and the associated heavy precipitation, turbulence, and lightning strikes. When the pilot informed Cleveland Centre that he was in heavy turbulence, the centre confirmed that there was an extremely large area of severe weather in his vicinity and suggested a turn to the left of track. Shortly after the pilot turned to the left, all contact with the aircraft was lost.

The sudden loss of all contact with the aircraft, combined with the debris found in Lake Erie, indicated that the aircraft descended vertically. Not enough of the main wreckage was recovered to determine if the aircraft suffered an in-flight breakup or if the loss of control was due to other reasons; however, this type of descent profile and sudden loss of radar contact are characteristic of an in-flight breakup.

*FINDINGS:*

**Cause Related:**
1. The route and altitude selected and flown on the IFR trip to Brantford, Ontario was in proximity to, and parallel to, a fast-moving frontal system and associated severe weather.

2. The aircraft crashed for undetermined reasons.

**Other:**
-Nil-

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## CESSNA P210N C-GVVY
## BARRIE EXECUTIVE AIRPARK, ONTARIO
## 27 AUGUST 1986

REPORT NUMBER: 86-O/60079 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1250 EDT
OPERATION: Private Other
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 525 | 175 |
| LAST 90 DAYS | 50 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*SUMMARY REPORT:*

The pilot and three passengers returned to the airport after a local demonstration flight. The aircraft touched down hard and bounced. As there was insufficient runway remaining to land the aircraft the pilot attempted a go-around. He applied full power and selected the landing gear up. The aircraft touched down with the gear partially retracted and slid off the left side of the runway.

The wind was gusty and variable, varying from 50 to 80 degrees off the runway heading, and gusting from 10 to 14 knots.

The aircraft was near the stall speed, and the stall warning horn sounded when the landing gear doors opened, and the gear rotated to retract. The drag induced by the retracting gear caused the aircraft to settle back to the runway.

*FINDINGS:*

**Cause Related:**
1. The pilot prematurely selected the landing gear up while the aircraft was near the stall speed, and the increased drag caused the aircraft to settle onto the runway.

**Other:**
-Nil-

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## ARNDT-AIR LTD.
## PIPER PA-25 PAWNEE C-GRHL
## FI' LMORE, SASKATCHEWAN 5 mi S
## 28 AUGUST 1986

REPORT NUMBER: 86-C60090 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1835 CST
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 500 | 240 |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was engaged in spraying a field with pesticide. The wing tip of the low-wing aircraft struck a power line as the aircraft made a steep climbing turn at the end of the first run. The aircraft stalled and crashed, seriously injuring the pilot.

Because the pilot had sprayed the area the previous summer, he did not make a ground reconnaissance of the area. The pilot's view of the ground was partly obscured by the low-wing configuration of this aircraft, and the pilot did not observe the power line during his airborne check for obstructions. As a result, the aircraft flew into the power line, causing the aircraft to stall and crash. The weather, which was clear, was not a factor in the accident.

***FINDINGS:***

**Cause Related:**
1. The pilot did not notice the power line when he checked the area for obstructions.

2. The aircraft struck the power line during pull-up from the first spray run, causing the aircraft to stall and crash.

**Other:**
- Nil -

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## RISK OF COLLISION BETWEEN: BRITISH AEROSPACE AIRCRAFT GROUP CONCORDE G-BOAF AND AERO COMMANDER 500B C-FFUP
## KLEINBURG, ONTARIO
## 30 AUGUST 1986

LOCAL TIME: 1026 EDT
INFORMATION SOURCE: Field Investigation

BRITISH AEROSPACE AIRCRAFT GROUP CONCORDE G-BOAF
REPORT NUMBER: 86-O/64914 (Incident)
OPERATOR: British Airways Corp.
OPERATION: Charter
DAMAGE: None
PILOT LICENCE: Airline Transport (British)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 10 |
| PASSENGERS | - | - | 100 |

AERO COMMANDER 500B C-FFUP
REPORT NUMBER: 86-O/64914 (Incident)
OPERATOR: Photosur
OPERATION: Specialty Aerial Photography
DAMAGE: None
PILOT LICENCE: Unknown

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | - |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The Concorde had departed Toronto/Lester B. Pearson International Airport and was climbing on an instrument flight rules (IFR) clearance in visual meteorological conditions (VMC). As the aircraft was climbing through 10,000 feet, the crew was advised by the air traffic controller that there was visual flight rules (VFR) traffic (an Aero Commander) at 11 o'clock, six miles, altitude unknown, but probably at low level. Two additional traffic advisories were subsequently given to the crew, 12 o'clock, three miles and 12 o'clock, one mile. The Concorde crew observed the traffic at the same altitude and deviated from the assigned course to increase the separation as they passed behind the traffic. The crew stated

they felt a collision would not have occurred if there had been no deviation from the assigned course, but they felt that it was prudent to turn and pass farther behind the other aircraft.

*PERTINENT INFORMATION:*

The Aero Commander was in contact with the terminal VFR controller, and the Concorde was in contact with the departure controller. Both controllers had the aircraft on radar, but the VFR controller was not able to advise the departure controller of the VFR traffic because of his workload at the time and because of intermittent operation of the Aero Commander's transponder - there was no altitude readout for it on the radar screens.

*ANALYSIS:*

The IFR aircraft, in visual conditions, was advised of the traffic, and a deviation was instigated at the discretion of the crew. The deviation from course was not necessary to prevent a collision but was prudent to increase separation.

*FINDINGS:*

**Cause Related:**
1. Although there was no risk of collision, the crew thought it prudent to alter course to increase the separation of the two aircraft.

**Other:**
-Nil-

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## CESSNA 185C SKYWAGON C-FLIS
## MOUNT BALOURDET, BRITISH COLUMBIA
## 03 JANUARY 1986

REPORT NUMBER: 86-P60001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1430 MST (Estimated)
OPERATION: Private Company Business
DAMAGE: Destroyed
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 632 | 213 |
| LAST 90 DAYS | 34 | 34 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

*HISTORY OF THE FLIGHT:*

The aircraft was on a visual flight rules (VFR) flight between the Boring Ranch strip, British Columbia and Fox Pass Lake. It had taken off at 1330 mountain standard time (MST), 03 January 1986, on a 24-hour verbal flight notification and failed to arrive at destination or return to the point of departure. The aircraft was located on 15 June 1986 by a private search party. It had crashed on the east side of Mount Balourdet, within five nautical miles of its destination. The pilot received fatal injuries.

*PERTINENT INFORMATION:*

The pilot was thoroughly familiar with the geography of the route. In the four weeks preceding the occurrence, he had attempted the identical flight 16 times, and, on three occasions, he had had to return to the point of departure because of inclement weather. The pilot's Class II instrument rating, obtained in March of 1981, had expired on the first day of April 1982.

The aircraft was wheel-ski equipped. On board were the pilot, 950 pounds of freight, full fuel tanks, and an estimated 100 pounds of miscellaneous items. Based on a standard winter weight of 188 pounds for the pilot, the aircraft's all-up-weight (AUW) at take-off was calculated to be 3,688 pounds, or 488 pounds over the maximum allowable. The centre of gravity (C of G) was determined to be at 47.56 inches aft of the datum, one inch in excess of the rearward limit. In the four weeks preceding the occurrence, the pilot had operated the aircraft with similar loads on 16 occasions.

Following tree contact 14.3 metres above the ground, the aircraft struck the ground in a steep, nose-down, left-side-low attitude, 12 metres from the point of first contact. Its flight path angle was 50 degrees and its impact angle with the ground was in excess of 60 degrees. The aircraft was destroyed; the wreckage extended for 46 metres along a heading of 305 degrees magnetic.

In a conversation sometime before the last flight, without being specific, the pilot had commented that the trim on the aircraft "acted funny". The on-site investigation did not reveal any evidence of failure or malfunction of the aircraft, the engine, or any of the components or controls.

The Fort St. John weather station, located 78 nautical miles southeast of the Boring Ranch, reported visual meteorological conditions (VMC), at the time of the aircraft's departure. The en route weather, as reported by the chief pilot of a charter company, was generally good with fog and low clouds in the valleys. This condition had existed during an earlier flight that day; the occurrence pilot had reported that, during that flight, he had

descended through a hole in the clouds in the vicinity of his destination in search of his point of intended landing. A general deterioration of the weather, first in the vicinity of Fox Pass Lake and then along the route, was confirmed by another pilot who, due to weather restrictions, could not refly the track of the missing aircraft on the same day. The Search and Rescue (SAR) crews encountered inclement weather from the first day that the search was launched and for several days thereafter.

The direct distance between the Boring Ranch strip and Fox Lake is 114 nautical miles in a direction 263 degrees magnetic. The terrain is mountainous, and peaks along the route exceed 9,000 feet in elevation.

*ANALYSIS:*

The pilot's familiarity with the terrain, and the fact that he had successfully completed the previous flight by penetrating cloud without having sighted the point of intended landing, in all probability, motivated him on this flight to attempt a similar procedure. It is believed that the pilot was flying above cloud, and once in the vicinity of his destination, he descended through cloud in an attempt to regain contact with the ground. During this descent, the pilot probably lost control, and the aircraft struck the side of the mountain in a steep, nose-down attitude.

*FINDINGS:*

**Cause Related:**
1. The pilot arrived over the Fox Pass area which was obscured by low cloud and fog.

2. While the pilot was attempting to regain visual reference with the ground, the aircraft entered cloud and struck trees on the side of the mountain.

3. The aircraft was overloaded and the C of G was beyond its rearward limit.

**Other:**
- Nil -

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## CESSNA 206 STATIONAIR N765FX
## PRINCE RUPERT, BRITISH COLUMBIA 13 mi SW
## 10 JANUARY 1986

REPORT NUMBER: 86-P60901 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 0925 PST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Airline Transport (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 14,500 | 2,000 |
| LAST 90 DAYS | 20 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The aircraft, with two pilots on board, was on a visual flight rules (VFR) flight from Ketchikan, Alaska to Bellingham, Washington. As the aircraft approached Prince Rupert, British Columbia, oil began to flow from the front of the engine across the top of the engine cowling and onto the windshield. After a few seconds, visibility through the windshield was restricted. The engine (Continental I0520) lost power and began to make loud noises. Prince Rupert Flight Service Station was advised of the situation, and the aircraft was ditched in calm waters. The two occupants successfully evacuated the aircraft,boarded an inflatable life-raft they carried in the aircraft, and paddled to a nearby island. They were picked up by a helicopter from Prince Rupert.

The aircraft sank in 25 feet of water, and it was several days before the aircraft, minus the propeller, was recovered.

The engine was inspected, and the crankshaft was found to have failed at the propeller flange. A review of the aircraft's history revealed that the aircraft had been involved in a landing accident some months before while operating on amphibious floats. On that occasion, a water landing was carried out with one wheel down. The aircraft turned over on touchdown, damaging the flaps, one wing tip, and the propeller. The engine appeared to be undamaged. The crankshaft was dial-checked and found to be within limits. A new propeller was installed, and the aircraft was returned to service. The aircraft had flown an additional 7 to 10 hours when the crankshaft failure occurred.

Service Bulletin (SB M84-16) Teledyne Continental, the engine manufacturer, deals with engine examination after a propeller strike. This bulletin identifies the

propeller flange as an area of the crankshaft likely to sustain damage. The manufacturer states that the only sure way to check for damage is engine disassembly and ultrasonic inspection of the crankshaft. The provisions of SB M84-16 had not been followed after the float-related accident; compliance was not mandatory.

The engine operating time of 7 to 10 hours from the first accident to the ditching would be consistent with a crankshaft failure caused by propeller-strike-induced damage.

The following laboratory report was completed:
LP72/86 - Crankshaft Failure Cessna 206, N756FX.

*FINDINGS:*

**Cause Related:**
1. The provisions of Teledyne Continental Service Bulletin M84-16 had not been followed after the float-related accident.

2. The engine crankshaft failed as a result of damage incurred during a previous propeller strike.

**Other:**
- Nil -

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## PIPER PA-28-140 CHEROKEE CF-GBW
## GRAND VALLEY, ONTARIO 2 mi E
## 21 JANUARY 1986

REPORT NUMBER: 86-O60002 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1607 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 197 | 146 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The pilot with one passenger on board had carried out a local flight and was returning to the private airstrip for a landing. The weather as reported by the pilot was clear skies, good visibility, temperature minus two degrees Celsius, and calm winds. The runway was sod covered and 1,500 feet in length.

The aircraft touched down approximately 500 feet from the threshold. During the landing roll, the pilot selected flaps up and applied the brakes. He stated later that he found the braking very poor, and, realizing that the aircraft was approaching the end of the runway, he decided to reject the landing roll and commence a go-around. The pilot applied full throttle but did not reselect the flaps to the recommended 25-degree position for a short-field take-off. The aircraft overran the runway and struck a rail fence, 76 feet beyond the end of the runway. The aircraft then ploughed through a snow-drift and came to rest in an upright position in deep snow. The snow-drift reduced the aircraft's impact; the impact forces were insufficient to activate the emergency locator transmitter.

The aircraft flew over one-third of the runway before touching down. As a result, only 1,000 feet of runway remained. The temperature at the time was just below freezing, and it is possible that a thin layer of frost was covering the runway, a condition which may have contributed to the aircraft's poor braking.

The Piper owner's manual recommends the flaps be lowered to the 25-degree position for a short-field take-off. The flaps on the aircraft were selected full-up after touchdown and were never reselected. This selection would result in a longer take-off run before the aircraft could become airborne.

*FINDINGS:*

**Cause Related:**
1. The pilot touched down about 500 feet from the threshold leaving only 1,000 feet of runway in which to stop.

2. Poor braking action prevented the pilot from stopping on the remaining runway length.

3. The pilot decided to reject the landing and commence a go-around.

4. The pilot did not reselect the flaps to the manufacturer's recommended setting for a short-field take-off.

**Other:**
-Nil-

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## GRUMMAN AMERICAN II GULFSTREAM N65ST TORONTO/LESTER B. PEARSON INTERNATIONAL AIRPORT, ONTARIO 27 JANUARY 1986

REPORT NUMBER: 86-O/64905 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2200 EST
OPERATION: Private Company Business
DAMAGE: None
PILOT LICENCE: Commercial (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 21,000 | 3,500 |
| LAST 90 DAYS | 60 | 60 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 3 |
| PASSENGERS | - | - | 3 |

### *HISTORY OF THE FLIGHT:*

The aircraft landed on runway 33 at night and cleared the runway via Hotel taxiway. The ground controller issued the pilot a taxi instruction to turn left on Romeo, left on Golf, and hold short of runway 15. The aircraft taxied along Romeo but, instead of turning left on Golf, proceeded straight down Romeo, crossing 24 right, an active runway. He then held short of runway 15 at Juliett taxiway where the deviation from the taxi instructions was discovered by ATC.

### *PERTINENT INFORMATION:*

The visibility was one and three-quarter miles in light snow, and the winds were 330 degrees at 10 to 15 knots.

To avoid conflict with aircraft taxiing from the north or south end of the airport for departures on runway 24 right, the controller instructed aircraft arriving on runway 33, and going to the north end of the airport, to take the longer routing.

The visibility was reduced in light snow, and the ground controller was not always able to visually monitor the movement of aircraft under his control. The airport surface detection equipment (ASDE) radar was not serviceable. The controller was not aware when N65ST deviated beyond his authorized taxi limit. The pilot stated that he had heard the taxi instruction clearly, but thought it odd that he was given such a circuitous routing to the Customs Building and not the more direct route. He assumed that the ground controller had made an error and proceeded to taxi along the routing he was anticipating. In doing so, he crossed an active runway without a clearance.

### *ANALYSIS:*

Although the pilot heard the controller correctly, he did not question the meaning behind the clearance. Because the routing anticipated by the pilot was more direct than that given by the controller, the pilot incorrectly assumed that the controller had made an error. The controller was unable to detect the deviation immediately because the visibility was reduced by snow and the ASDE radar was not serviceable.

### *FINDINGS:*

**Cause Related:**
1. The pilot did not comply with the ground controller's instructions, and, as a result, he crossed an active runway without clearance.

2. The ground controller was unable to monitor the movements of the aircraft because of poor visibility and the unserviceablility of the ASDE radar; as a result, he did not detect an unauthorized deviation from taxi instructions.

**Other:**
-Nil-

## AERONICA 7FC CHAMPION C-GUJA MASCOUCHE, QUEBEC AIRPORT 2 mi S FEBRUARY 15, 1986

REPORT NUMBER 86-Q60006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1225 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 360 | 125 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

### *HISTORY OF THE FLIGHT:*

The pilot/owner of the ski-equipped aircraft left the Mascouche, Quebec Airport with one passenger and landed on the Rivière des Mille-Iles, Quebec, two miles to the south. A few moments later, the aircraft took off toward the west, near the north shore of the river and parallel to

it. During the climb, at approximately 300 feet above ground level, the pilot made a turn to the left, banking more than 80 degrees, and the aircraft nose dived to the ground. The aircraft came to rest upright on its nose on the river. The two occupants received fatal injuries.

*PERTINENT INFORMATION:*

The pilot was qualified and had experience on this aircraft. The wind was 230 degrees at 10 knots; the temperature was minus seven degrees Celsius, the dew point was minus eight degrees Celsius, and visibility was 10 miles in very light snow. The take-off and climb area was unobstructed. The technical investigation showed that there was no aircraft malfunction and that the engine was generating power at the time of impact.

The aircraft was refuelled before take-off with uncontaminated fuel of the type specified by the manufacturer. The weight of the aircraft was 1,466 pounds, or 16 pounds over the allowable weight. Weight over that recommended by the manufacturer increases the stall speed. The centre of gravity was 18.15 inches behind the reference line, that is, 0.95 inches aft of the allowable rear limit of 17.2 inches. A centre of gravity behind the reference line increases the stall speed and changes its characteristics. In these conditions, it can be very difficult, if not impossible, to come out of a spin.

According to the pilot's manual, the maximum climb speed of this aircraft is about 100 miles per hour (mph); the normal climb speed is not indicated. With an 80-degree bank, the stall speed is about 120 mph.

The two occupants had buckled their seat-belts. The seat-belt of the rear pasenger did not withstand the impact. Laboratory tests revealed that the resistance of the seat-belt was below the manufacturer's specifications and the decreased resistance was attributed to age. The passenger's injuries would not have been significantly any less serious had the seat-belt not failed.

*ANALYSIS:*

For undetermined reasons, the pilot made a steeply banked turn over an unobstructed location. During the turn made at too low a speed for the angle of bank, the aircraft entered a spin. The aircraft was too low to effect a recovery. The situation was aggravated because the weight was more than that recommended by the manufacturer and the rear load distribution was outside allowable limits.

The following laboratory reports were completed: LP 57/86 - Seat-belt Analysis; and LP 58/86 - Instruments Analysis.

*CONCLUSIONS:*

**Cause-Related Findings:**

1. During a steeply banked turn at low speed, the aircraft went into a spin, and the pilot could not effect a recovery because the aircraft was too low.

2. The weight and the load distribution were outside allowable limits, thus changing the characteristics of the aircraft.

**Other:**

- Nil -

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## PIPER PA-32-300 C-GNQG
## BLOODVEIN RIVER, MANITOBA
## 21 FEBRUARY 1986

BRIEF NUMBER: 86-C60009 (Accident)
LOCAL TIME: 1308 CST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 475 | 45 |
| LAST 90 DAYS | 48 | 43 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

During the approach to a 3,000-foot snow-covered strip, the aircraft struck a snowbank short of the runway. The left main landing gear sheared, and further damage occurred before the aircraft came to rest. The pilot was not injured.

The approach direction was into sun which made it difficult for the pilot to judge his height. An airport inspection conducted shortly after the occurrence revealed that the standard of snow clearing was less than satisfactory.

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## CESSNA 172H SKYHAWK CF-QXE
## THE PAS/GRACE LAKE, MANITOBA
## 22 FEBRUARY 1986

**BRIEF NUMBER:** 86-C60011 (Accident)
**LOCAL TIME:** 1335 CST
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 103 | 35 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

During the take-off roll, the aircraft swerved sharply left. The pilot closed the throttle but was unable to stop the aircraft before it hit a snowbank and overturned.

The gravel runway had been ploughed, and there were patches of packed snow, bare gravel, and ice on the runway surface. It was a clear, winter day, minus 15 degrees Celsius, with a light to moderate wind from the left, about 20 degrees off the runway heading. The pilot had taxied through snow a few inches deep to get to the taxiway and, thereafter, made a series of left turns to get into position for take-off. Considerable use of the left brake had been made, with accumulated snow in the brake area melting and then freezing. When the pilot stopped the aircraft on the runway in preparation for take-off, the water/slush froze, effectively resulting in a seized brake. Because the wheel was sliding over snow and ice patches, the brake did not grab until it hit a patch of gravel. The aircraft then served left.

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## CESSNA 182P C-GUBO
## WAASAGOMACH, MANITOBA
## 24 FEBRUARY 1986

**BRIEF NUMBER:** 86-C60012 (Accident)
**LOCAL TIME:** 1300 CST
**OPERATION:** Private Company Business
**DAMAGE:** Substantial
**PILOT LICENCE:** Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 475 | N/A |
| LAST 90 DAYS | 53 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was on a flight to deliver goods to a small community. He elected to land on a snow-covered road. On landing, the wheels broke through the snow crust, and the aircraft flipped onto its nose and right wing tip before coming to rest in the upright position. The pilot was not injured.

The pilot had used the same area previously, and, from the air, the road appeared to have been ploughed and satisfactory for landing. The snow was hard packed but of insufficient strength to withstand the weight of the landing aircraft.

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## PIPER PA-22-150 C-GTYO
## TORONTO/BUTTONVILLE AIRPORT, ONTARIO
## 01 MARCH 1986

**REPORT NUMBER:** 86-O/60009 (Accident)
**INFORMATION SOURCE:** Field Investigation
**LOCAL TIME:** 1530 EST
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 430 | 96 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot landed on runway 33, a 3,750-by-100-foot dry paved runway. On touchdown, the aircraft bounced and began to drift toward the edge of the runway. When the aircraft touched down a second time, the pilot applied the brakes, and the aircraft nosed over.

The wind at the time of the occurrence was from 270 to 300 degrees at 15 gusting to 23 knots.

No pre-occurrence aircraft malfunction or failure that could have contributed to the cause of this accident was found. The aircraft landing gear had been changed from tricycle to tail wheel in accordance with Supplemental Type Certificate, Number SA45RM.

When the pilot realized that the aircraft was going to run off the runway, he applied the brake heavily to stop the aircraft. The harsh application of brake caused the aircraft to nose over.

***FINDINGS:***

**Cause Related:**
1. Directional control of the aircraft was lost on touchdown.

2. Heavy application of the main wheel brakes caused the aircraft to nose over.

**Other:**
-Nil-

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## CESSNA 120 C-FECP
## PEMBERTON, BRITISH COLUMBIA
## 02 MARCH 1986

REPORT NUMBER: 86-P60007 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1730 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: None

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 100 | 70 |
| LAST 90 DAYS | 40 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The wheel-equipped aircraft was landing on the snow-covered runway of Pemberton Airport. Immediately after touch-down, the main wheels broke through the snow surface crust, and the aircraft flipped over.

The snow cover on the runway was 16 to 18 inches thick. The Pemberton Airport had no winter maintenance. The pilot, who did not contact the airport operator to obtain the runway conditions before departure was aware of the absence of winter maintenance. He did not hold the licence required to carry out this flight.

Unaware of the actual runway conditions, the pilot attempted a landing on a snow-covered runway with an aircraft unsuitably equipped for snow operations. As a result, the main wheels broke through the snow surface, causing the aircraft to flip over.

***FINDINGS:***

**Cause Related:**
1. The pilot did not establish the runway condition prior to departure.

2. The aircraft was unsuitably equipped for snow operations.

**Other:**
1. The pilot did not hold the licence required to carry out this flight.

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## PIPER J3 CUB C-FPPK
## ASHERN, MANITOBA
## 15 MARCH 1986

REPORT NUMBER: 86-C60017 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1600 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 300 | 150 |
| LAST 90 DAYS | 1 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot landed his aircraft in a partially snow-covered grass meadow after a local pleasure flight. Although he had selected an area almost clear of snow, he landed further downfield than planned. The aircraft ran into a snowbank off the end of the landing area and nosed over.

The pilot misjudged his approach slightly and landed beyond the planned touchdown point. Because the aircraft landed long and braking action was poor, the pilot was unable to bring his aircraft to a stop in the remaining distance available to him.

***FINDINGS:***

**Cause Related:**
1. Because the aircraft was landed long and the braking action was poor, the pilot could not stop the aircraft before it overran the strip.

2. The aircraft nosed over when it hit a snowbank off the end of the landing area.

**Other:**
-Nil-

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## CESSNA 172L SKYHAWK C-GSAL
## ARCHERWILL, SASKATCHEWAN
## 26 MARCH 1986

BRIEF NUMBER: 86-C60019 (Accident)
LOCAL TIME: 1715 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 138 | 130 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

***REPORTED CIRCUMSTANCES:***

The engine began to run rough while the aircraft was cruising at about 1,000 feet above ground level. The pilot selected carburettor heat on, and, because the engine roughness worsened, he decided to land on a nearby highway. On final approach, the left wing struck a power line which crossed the highway. The aircraft veered to the left and struck the ground beside the selected landing area.

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## CESSNA 172 C-FRVG
## VIRDEN (WEST) AIRPORT, MANITOBA
## 24 MARCH 1986

BRIEF NUMBER: 86-C60020 (Accident)
LOCAL TIME: 1700 CST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 210 | 140 |
| LAST 90 DAYS | 7 | 7 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was approaching a 2,300 foot clay and gravel strip and had planned to touch down beyond an area of wet ground in the first quarter of the runway. On short final, with 30 degrees of flap selected and at fairly low airspeed, the pilot closed the throttle and flared the aircraft. The aircraft veered right. The pilot applied full power and lowered the nose in an attempt to gain airspeed for an overshoot, but the aircraft drifted to the right, and the right main wheel struck a knoll at the edge of the runway.

The pilot stated that the local surface wind was from 060 degrees and gusting.

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## PIPER PA 23-250 C-FRLT
## PARRY SOUND/GEORGIAN BAY AIRPORT, ONTARIO
## 1 APRIL 1986

REPORT NUMBER: 86-O60013 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1400 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7,500 | 250 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot departed the airport at about 1300 EST on a local flight. After an hour of flight time, he returned and commenced a straight-in approach to runway 17. A cross-wind was blowing from the right at 20 to 25 knots. The aircraft landed wheels-up and was substantially damaged.

The pilot had not flown this type of aircraft for several months. Because of the strong cross-wind, he interrupted his pre-landing check and decided to delay extending the landing gear, in order to maintain a higher than normal approach speed. As a result, the pilot forgot to lower the gear before landing, and the aircraft touched down with the wheels retracted.

***FINDINGS:***

**Cause Related:**
1. The landing gear was not extended prior to touchdown.

**Other:**
1. The pilot had not flown this type of aircraft for several months.

## PIPER PA-22 135 TRIPACER C-FQXB
## LA RIVIERE, MANITOBA 8 mi S
## 06 APRIL 1986

REPORT NUMBER: 86-C60024 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1315 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 133 | 70 |
| LAST 90 DAYS | .2 | .2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was flying his aircraft from the local airstrip to his farm. Because the fields were too wet to support a landing, he carried out an approach to a stretch of paved road near his driveway. While on short final, the aircraft struck a power line, then touched down heavily on the road. The nose gear and right main gear collapsed, and the aircraft rolled a short distance along the left side of the road, then veered to the left into a ditch.

The pilot, who had not conducted a pre-flight inspection of the proposed landing area, had landed on this stretch of road before and was aware of the existence of the wires that the aircraft hit. He concentrated his attention on an intersection where he believed a power line spanned the road; he did not see a double-strand feeder line about 400 feet beyond, which crossed the aircraft's glide path. The pilot stated that he simply forgot about the wires as he looked for the power line at the intersection. The weather was suitable for the flight, and there were no restrictions to visibility.

Because the pilot had not inspected the landing area prior to this flight and because he was looking for wires to the right of his approach path, he did not see the power line crossing the road.

***FINDINGS:***

**Cause Related:**
1. The pilot did not inspect the proposed landing site for obstacles prior to conducting the flight.

2. On short final, the aircraft struck a power line which crossed the aircraft's flight path.

**Other:**
-Nil-

## STINSON 108-2 C-GUBC
## SPRINGDALE, NEWFOUNDLAND
## 8 APRIL 1986

BRIEF NUMBER: 86-A60011
LOCAL TIME: 1635 NST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,500 | 20 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was landing the aircraft after a local flight, when he decided to reject the landing and applied power. The engine did not respond. The aircraft overran the remaining runway, entered the snow-covered overun area, and nosed over.

The throttle linkage had broken, and the engine had remained at or near idle power.

## CESSNA 180H C-GRPR
## NIPAWIN, SASKATCHEWAN
## 09 APRIL 1986

REPORT NUMBER: 86-C60026 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1715 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 450 | 150 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot landed the wheel-equipped aircraft after a 45-minute sightseeing flight. Shortly after touchdown, the aircraft began to shudder and oscillate, and it then swung uncontrollably to the right. The aircraft ran off the runway and came to a stop with the left wing tip resting on the ground.

The aircraft was under gross weight, and the centre of gravity was within the prescribed limits. Records indicate that the aircraft was maintained in accordance with prescribed maintenance schedules.

During the landing, the left main gear leg of the aircraft failed, causing the aircraft to run off the runway. The CASB Engineering Laboratory determined that the failure was caused by a progressive fracture of the gear attachment bolt (part number AN7-20A). The bolt had been in service for 70 hours of flying time prior to the occurrence.

The following laboratory was completed: LP 85/86 - Undercarriage Attachment Bolt Failure.

***FINDINGS:***

**Cause Related:**
1. Shortly after landing, the left main landing gear failed due to a progressive fracture of the gear attachment bolt.

**Other:**
-Nil-

598873 ONTARIO LIMITED
(BUSINESS AIR SERVICES & SKY HARBOUR REFINISHING)
CESSNA 414 C-FGZH
GODERICH AIRPORT, ONTARIO
12 APRIL 1986

REPORT NUMBER: 86-O/60016 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1430 EST
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 13,000 | 70 |
| LAST 90 DAYS | 100 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*HISTORY OF THE FLIGHT:*

The aircraft departed Goderich on a ferry flight to London, Ontario, where some pilot training was to be carried out.

During the climb-out, after the gear had been selected up, the green down-and-locked lights were still illuminated, and the gear motor circuit-breaker had tripped. The circuit-breaker was reset, and the gear was reselected up. The gear appeared to retract normally.

Upon arrival at London, the pilot selected the gear down; however, the nose gear down-and-locked light did not illuminate. A fly-pass was carried out past the control tower, and the controller confirmed that the nose gear was not fully extended. The pilot then retracted the gear and carried out a manual gear extension; however, he was still unable to obtain the nose gear down-and-locked light. The pilot elected to return to Goderich and land the aircraft on the grass runway. On touchdown, the nose gear collapsed.

*PERTINENT INFORMATION:*

Investigation revealed that the bracket and bearing assembly which supports the outboard end of the nose gear retraction torque tube had failed. The bracket assembly was sent to the Canadian Aviation Safety Board Engineering Laboratory, and it was determined that the fractures of the bracket were consistent with those of an overload failure.

Failure of this bracket and bearing assembly may result from incorrect rigging of the system, from the nosewheel skirt catching on the actuator rods of the nose gear doors if the shock strut extension is low, or from a load applied to the gear while it is in transit. There was no indication of the nose gear binding on any part of the airframe structure, and the nose gear shock strut extension was normal. There was no evidence of a load being applied to the gear and, because of the extent of the damage in the nose gear retraction system, a functional test could not be carried out, nor was it possible to verify correct system rigging.

*ANALYSIS:*

The nose gear did not extend into the down-and-locked position because the bracket and bearing assembly, which supports the outboard end of the nose gear retraction torque tube, had failed. Laboratory analysis of the bracket assembly indicated that the fractures were consistent with those of an overload failure, the cause of which is undetermined.

The following laboratory report was completed:
LP 102/86 - Nose Landing Gear Mount Bracket.

*FINDINGS:*

**Cause Related:**
1. The bracket and bearing assembly which supports the outboard end of the nose gear retraction torque tube failed in overload for undetermined reasons.

2. The nose gear did not extend into the down-and-locked position because the bracket and bearing assembly had failed.

3. On touchdown, the nose gear collapsed because it was not fully down and locked.

**Other:**
-Nil-

## PITTS S2A C-GTBE
## WATERLOO/WELLINGTON AIRPORT, KITCHENER, ONTARIO
## 14 APRIL 1986

BRIEF NUMBER: 86-O/60020 (Accident)
LOCAL TIME: 1557 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 550 | 6 |
| LAST 90 DAYS | 11 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot was on his first solo flight following his check-out in the aircraft type and had made several touch-and-go landings. Following a hard landing and swerve to the right, the aircraft bounced; the pilot applied power and overshot. The tower controller confirmed that the right wheel pant had been damaged. An emergency was declared, and the pilot landed without further incident. The right tire, wheel pant, landing gear, brake assembly, and tips of the propeller were damaged.

During his pre-flight walk-around, the pilot had observed that the right tire pressure appeared lower than normal but had judged it to be acceptable. The aircraft was equipped with wheel pants which makes examination and servicing of tires difficult.

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## PIPER PA-30 TWIN COMANCHE C-GOTW
## GUELPH AIRPORT, ONTARIO
## 17 APRIL 1986

REPORT NUMBER: 86-O/60022 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1510 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,000 | 600 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot flew from Hamilton, Ontario to the Guelph Airport. On arrival, he checked the wind indicator and joined the circuit for runway 23. He landed near the threshold and applied the brakes. The aircraft overran the runway, rolled over a steep bank, and stopped. The nose gear and left main landing gear collapsed.

The wind was from 050 degrees, and the wind sock was indicating a wind speed of 18 to 20 knots. The asphalt runway which is 2,200 feet long was dry at the time. The pilot stated that the brakes were working normally.

The landing was made with a tail wind because the pilot had misread the wind indicator. After landing, the pilot applied brakes, but, by the time he realized that he would not be able to stop the aircraft on the runway, he had insufficient speed and runway remaining to reject the landing.

*FINDINGS:*

**Cause Related:**
1. The pilot misread the wind direction and landed downwind.

2. By the time the pilot realized that he would not be able to stop the aircraft on the runway, it was too late to reject the landing.

**Other:**
-Nil-

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CHRISTAVIA CA-05 (Amateur-built) C-GGBS
ROSLIN, ONTARIO
22 APRIL 1986

REPORT NUMBER: 86-O/60023 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1830 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 850 | 460 |
| LAST 90 DAYS | 50 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The aircraft departed Belleville Airport for a local flight. After 20 to 30 minutes of sightseeing, the pilot decided to fly to a nearby private strip and carry out a practice approach before returning to Belleville.

The approach was without incident, and power was applied to overshoot. At a height of approximately 75 feet, the engine lost power and stopped. While attempting to force-land in a nearby field, the aircraft suddenly pitched nose-down and crashed.

The aircraft struck the ground at an angle of about 15 degrees then bounced and came to rest approximately five feet from the initial impact.

When the fuel cap was opened, the sound of rushing air could be heard; the cap was not vented. The carburettor float bowl was empty, the carburettor inlet finger screen was clean and free of contaminants, and fuel flow from the tank to the gascolator bowl was unrestricted. The gascolator bowl was damaged during impact; therefore, the fuel flow could only be checked to that point.

The aircraft was originally equipped with a fuel cap which incorporates a wire and float fuel quantity indicator. This type of fuel cap provides venting for the fuel tank. The pilot reported that he had been concerned about rain water getting into the fuel tank between the indicator and the fuel cap. Consequently, he had been experimenting with a non-vented cap in place of the original cap.

The pilot had drilled two small holes in the side of the fuel tank filler neck to act as secondary vents. Examination of the holes revealed that they were plugged with dope from a previous fabric repair in that area.

The pilot estimated that he had approximately 10 gallons of fuel on board and flew the aircraft for 20 to 30 minutes before carrying out the practice approach. The fuel tank capacity is 15 gallons, and the aircraft consumes approximately 4.8 gallons per hour. Following the accident, there was usable fuel in the tank.

The pilot sustained a bruised shoulder from the shoulder harness and a spinal injury due to impact.

The empty carburettor float bowl and the sound of rushing air as the fuel cap was opened indicate that the engine power loss was due to fuel starvation which was caused by the unvented cap. As fuel is consumed, air pressure within the tank decreases. Eventually, a point is reached where fuel can no longer be drawn. This will occur sooner with a full fuel tank than one partially filled, because there is less air volume inside a full tank, and, consequently, the air pressure will decrease more rapidly.

The impact marks and the sudden dropping of the aircraft indicate that the aircraft stalled with insufficient height to recover. The stall was a result of the pilot stretching the aircraft's glide path to clear some trees, and allowing the airspeed to get too low.

The use of the shoulder harness by the pilot prevented serious head injuries and possibly saved his life.

*FINDINGS:*

**Cause Related:**
1. The substitution of an unvented fuel cap for a vented fuel cap resulted in fuel starvation and subsequent engine stoppage.

2. The aircraft stalled with insufficient height in which to recover. The stall was a result of the pilot stretching the glide path to clear some trees, and allowing the airspeed to get too low.

**Other:**
1. The use of a shoulder harness by the pilot prevented serious head injuries.

## CESSNA 172F C-GXMR
## RANKIN INLET, NORTHWEST TERRITORIES
## 26 APRIL 1986

BRIEF NUMBER: 86-C60031 (Accident)
LOCAL TIME: 2050 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,506 | 900 |
| LAST 90 DAYS | 32 | 32 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was returning to Rankin Inlet because the weather at destination was unsuitable. Approximately 15 miles from the airport, the engine began to run rough; full carburettor heat was applied without effect. About five miles from the airport, the engine stopped, and the pilot attempted to glide to the runway. Insufficient height was available, and the aircraft landed 50 feet short of the threshold; the right wing was damaged. After landing, an excessive amount of ice crystals was found in the fuel sump screen.

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## PIPER PA-12 SUPER CRUISER CF-LGF
## MANILLA, ONTARIO 3 mi NE
## 27 APRIL 1986

REPORT NUMBER: 86-O/60026 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1645 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 387 | 203 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The aircraft departed Oshawa for a cross-country flight in the Lindsay area. After approximately 45 minutes of flight time and at an altitude of 2,200 feet above sea level (asl), the pilot retarded the throttle below 2,000 rpm to decrease the aircraft's airspeed. Shortly after the power reduction, the engine began to lose power. Carburettor heat was applied, but the engine continued to lose power and finally quit. Attempts to restart the engine failed, and a forced landing was carried out on a grass field. During the landing roll, the left main gear collapsed, and the aircraft ground looped.

An examination of the engine did not reveal any evidence of a pre-occurrence failure or malfunction. The engine was ground run, and its operation was normal and carburettor heat was functional.

The closest meteorological stations are Trenton and Muskoka. Trenton reported the temperature and dew point as 19 and 13 degrees Celsius respectively, and Muskoka reported the temperature and dew point as 25 and 12 degrees Celsius respectively. The temperature and dew point combinations present at the time of the occurrence were conducive to the formation of moderate carburettor icing during cruise power and serious icing during descent power.

The examination of the left landing gear revealed that the bungee cord had failed in overload due to the rough ground, thus allowing the gear to collapse.

***FINDINGS:***

**Cause Related:**
1. The environmental conditions were conducive to carburettor icing.

2. During the landing roll, the left landing gear bungee cord failed in overload due to the rough ground, and the gear collapsed.

**Other:**
-Nil-

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CESSNA 170A N9020A
VALLEYVIEW, ALBERTA 12 mi W
03 MAY 1986

REPORT NUMBER: 86-W60901 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1000 MDT
OPERATION: Private Ferry
DAMAGE: Destroyed
PILOT LICENCE: Private (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 350 | 20 |
| LAST 90 DAYS | 22 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot filed a visual flight rules (VFR) flight plan and received a weather briefing at the Whitecourt, Alberta flight service station (FSS) for a flight to Fort St. John, British Columbia. The actual and forecast weather for the intended route and destination varied from marginal VFR to below VFR. A special VFR departure was required for the take-off at Whitecourt.

The pilot flight planned to follow the Victor airway; however, because of poor weather encountered after take-off, and his concern regarding navigation signals, he elected to follow a road to preclude becoming lost. Low ceilings prevailed along the route, and, about 12 miles west of Valleyview, the cloud base converged with rising terrain. The pilot attempted to make a 180-degree turn, during which he lost visual reference with the ground, and the aircraft crashed into trees about 800 feet south of the highway. The aircraft was destroyed by the impact, but the pilot, who received minor injuries, was able to exit through the broken windscreen.

The pilot attempted this flight into known adverse weather conditions and then continued as the weather deteriorated. When visual reference with the ground was lost, the pilot lost control of the aircraft, and it crashed into the trees.

***FINDINGS:***

**Cause Related:**
1. The pilot continued a VFR flight into adverse weather conditions.

2. The pilot flew into trees when he lost visual reference with the ground.

**Other:**
- Nil -

ZARN AIR LTD.
PIPER PA-18A SUPER CUB C-GARZ
HIGH RIVER, ALBERTA
08 MAY 1986

REPORT NUMBER: 86-W60010 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1130 MDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,500 | 250 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was attempting a take-off from a 3,000-foot paved runway in a 15- to 20-knot, 50-degree cross-wind from the right. The aircraft drifted off the left side of the runway after a ground roll of 800 feet, crossed over an intersecting runway, and ran down into a ploughed field, with the engine still running at full throttle. The pilot altered heading 90 degrees to the left and continued his attempt to get airborne, now with a strong tail wind and in the ploughed field. After a run of 1,200 feet in this direction, he applied full flap and pulled the aircraft clear of the ground in a nose-high attitude just before the aircraft struck a barbed wire fence. The aircraft passed through this fence and a second fence 60 feet further on and landed heavily in the field.

A witness to the take-off attempt noticed that no aileron was applied to counteract the effect of the cross-wind. Tracks left on the runway and across the intersecting runway gave no indication of the use of brakes. The brakes were inspected and found to be in good condition and fully serviceable. The pilot attempted the take-off from runway 06; runway 14 was available and was 30 degrees out of wind.

The pilot did not use proper cross-wind take-off techniques, and used poor judgement in attempting the take-off cross-wind when a more suitable runway was available. The reason for the pilot's unusual action in continuing the take-off attempt was not determined.

*FINDINGS:*

**Cause Related:**
1. The pilot selected a runway 50 degrees out of wind and was unable to maintain directional control on the runway.

2. The pilot continued his take-off attempt after leaving the runway.

**Other:**
-Nil-

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PIPER PA-22-150 TRI PACER C-FJMK
COLBORNE, ONTARIO 2 mi W
10 MAY 1986

REPORT NUMBER: 86-O/60034 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1125 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 415 | 327 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot departed from Cornwall Regional Airport, Ontario and flew direct to a private aerodrome located two miles west of Colborne, Ontario. On arrival, the pilot circled the area to observe the wind direction and decided to land towards the north on the single north/south oriented runway. Full flap was extended, and the approach was flown towards the north. The aircraft landed long, at which time, the pilot elected to go around. Full power was applied, and the aircraft became airborne but, on climb-out, collided with power lines at the end of the runway. The wires and two of the supporting poles broke, and the aircraft struck the ground a short distance beyond the wires.

The runway was 2,200 feet long by 50 feet wide turf, with an uphill grade. The runway surface was dry and well maintained. Two sets of power lines obstructed the runway, one set across the runway approximately 400 feet in from the threshold and the other set at the far end of the runway. Both sets of power lines crossed the runway at right angles. The aircraft approached over top and landed beyond the power lines at the threshold end of the runway. The wires at the threshold end of the runway were marked, but the wires at the end of the runway were not.

Weather conditions in the area were reported as high thin scattered to thin overcast cloud, with the visibility 15 miles. The temperature and dew point were 17 and 3 degrees Celsius, and the wind was from 022 degrees magnetic at five knots. The pilot reported the wind as calm or possibly light from the south.

The final approach was high, possibly because of the light or slight downwind condition, and the aircraft touched down long on the runway. When the pilot elected to go around after the aircraft was on the ground, he did not observe the power lines off the end of the runway in time to avoid colliding with them on climb-out.

*FINDINGS:*

**Cause Related:**
1. The pilot was attempting a go-around after landing down on the runway and did not observe the power lines in time to avoid them.

2. The aircraft collided with unmarked power lines at the end of the runway.

**Other:**
-Nil-

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AERONCA 7AC C-FJUT
HAWKESBURY, ONTARIO 3 mi E
10 MAY 1986

REPORT NUMBER: 86-O/60031 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1825 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 293 | 67 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | - |

## GRUMMAN TIGER AA5B C-GXMB
## HANEY, BRITISH COLUMBIA 7 mi N
## 19 MAY 1986

REPORT NUMBER: 86-P60020 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0505 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 299 | 46 |
| LAST 90 DAYS | 43 | 41 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | 1 |


### *SUMMARY REPORT:*

The pilot, with one passenger on board, took off towards the west from the east/west oriented runway, on a private local flight. As the aircraft approached the end of the runway on climb-out, it was observed to pitch nose-up and commence a turn to the right. The turn steepened, and the nose of the aircraft pitched down. The aircraft remained in this attitude until it struck the ground within the confines of the aerodrome. The pilot and passenger were injured.

The aircraft struck the ground at low speed in a steep, nose-down, right-wing-low attitude. Examination of the wreckage did not reveal any evidence of mechanical failure of the aircraft airframe, engine, or flight controls that would have contributed to the cause of the accident. The passenger's seat belt failed on impact, and as a result, his leg became entangled in the flight controls.

The weight of the aircraft at take-off was estimated to be at or above the maximum allowable take-off weight of 1,220 pounds. The centre of gravity was within the prescribed limits of 10.9 to 21.5 inches.

The emergency locator transmitter (ELT) was not switched to the "arm" position and, as a result, did not activate on impact.

Weather conditions at the time of the occurrence did not contribute to the cause of the accident.

The heavily loaded aircraft stalled and entered a spin to the right at low altitude, when the pilot attempted a climbing right turn immediately after take-off.


### *FINDINGS:*

**Cause Related:**
1. During a climbing right turn after take-off the aircraft stalled and entered a spin to the right at low altitude and struck the ground.

**Other:**
1. The emergency locator transmitter was not switch off the arm position, and as a result, it did not activate on impact.

2. The passenger's seat belt failed on impact.

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### *HISTORY OF THE FLIGHT:*

The pilot and his passenger took off at 0447 PDT from Vancouver International Airport on a visual flight rules (VFR) flight to Calgary on the morning of 19 May 1986. The pilot requested an initial cruising altitude of 3,500 feet above sea level (asl); as the flight progressed toward the east, the pilot changed the requested altitude to 2,000 feet and then to 1,500 feet. At 0501 PDT, the air traffic controller cleared the flight to en route frequencies and altitudes as required for the VFR flight. The aircraft did not arrive at its destination and was found, without the pilot or passenger on board, by search aircraft on 05 June 1986. The crash site was at the 3,000-foot level on the southwest slope of Mount Blanchard, near the Shard intersection on V304 airway and about 15 miles along track from the aircraft's last known position. The pilot's body was found 06 June and the passenger's body on 07 June 1986 - both some distance from the crash site. The cause of their deaths was determined to have been exposure.

### *PERTINENT INFORMATION:*

A month and a half before the accident, the pilot enrolled in a flight training school in Calgary and was receiving instruction on instrument flight procedures. He had not completed the course and did not have an instrument rating. The trip to Vancouver two days before the accident was the first time that the pilot had flown an aircraft across the mountains to the coast. On that flight, he flew his aircraft through clouds to fly on top of them at 12,500 feet. As he approached Vancouver, he descended through the clouds to regain visual contact with the ground.

The evening before the accident, the pilot, his passenger and some friends attended a supper party. When he returned to his hotel room, he phoned the airport for a weather briefing for the flight to Calgary and then went to bed for three or four hours. The early morning departure was scheduled because his passenger had to be at work in Calgary before noon.

The pilot took off from Vancouver about 44 minutes before sunrise, and the accident probably occurred about 20 minutes later. The cloud bases in the Vancouver area were generally around 3,000 feet, lowering occasionally to near 1,000 feet. At times, the visibility was one and a half miles in rain, drizzle, and fog. Weather reports are not available for the crash site area; however, the pilot's request for clearance to fly at 1,500 feet (asl), just as he flew beyond radar coverage, was presumably to avoid low cloud. The accident occurred at the 3,000-foot level, in an area that required an altitude of 6,600 feet asl for safe flight in clouds and reduced visibility.

There was no evidence of engine or aircraft system malfunction. The aircraft's navigation radios were tuned to Vancouver frequencies, and the track selected on the omni-bearing selector was 032 degrees. The V304 airway track is 037 degrees, and it is the most direct route between Vancouver and Enderby as flight-planned by the pilot.

The shoulder harness straps for both seats were found tied and stowed. The pilot received injuries to his head and chest when he was thrown forward into the instrument panel on impact. The passenger escaped with minor injuries. Although the aircraft was equipped with emergency survival equipment and the occupants had jackets and other clothing on board, both left the scene of the accident without taking anything with them and without leaving notification of their intentions. The emergency locator transmitter (ELT) was damaged in the crash and did not operate.

*ANALYSIS:*

The weather in the Vancouver area on the morning of the accident was marginally suitable for visual flight. As the pilot flew east toward the mountains, the cloud base gradually lowered as verified by the pilot's requests to fly at lower altitudes. Daybreak was near, but, because of the overcast skies, it was still quite dark. The visibility from the aircraft would have been poor, and, at times, rain showers would have reduced it to zero.

The aircraft initially contacted only the tops of trees on its flight path along steadily rising ground, indicating that it was probably under power and in a climb. The wreckage trail was nearly in a straight line and suggests that there was no attempt made to avoid contact with the trees by turning towards the low ground to the left. It is most probable that, because of clouds, precipitation, and the dim early dawn light, the pilot did not see the trees until he flew into them.

The 3,000-foot elevation of the crash site indicated that the pilot had climbed about 1,500 feet from his last known altitude. The crash heading of 315 degrees indicated that he had turned away from the airway track of 037 degrees. It is possible that he was climbing in an orbit, in an attempt to reach the top of the clouds and to stay on top of them as he had on the trip to Vancouver two days before. The location of the accident site, 15 miles along track from the aircraft's last known position, suggested that the pilot initiated the climb soon after he was informed that he was no longer in radar contact and that he should select altitudes and communication frequencies as necessary.

The pilot's motivation in attempting the flight in the poor weather could not be determined, although it is known that his passenger had a requirement to be in Calgary at noon that day. It also could not be determined why the two left the scene of the accident. It is probable that they would have been found soon, and alive, if they had taken advantage of the warm clothing and survival equipment and had not attempted to walk out, not knowing the direction to safety. Because the ELT was damaged in the crash and did not operate, the search was conducted along the entire route. As a result, the crash site was not found until after the occupants had perished.

*FINDINGS:*

**Cause-Related:**

1. The pilot attempted to continue the flight in poor weather conditions and below the required obstacle clearance altitude.

2. The pilot attempted to operate his aircraft in instrument flight conditions without being adequately trained.

3. The injuries the pilot received would have been reduced had he been wearing the available shoulder harness.

4. The ELT was damaged in the crash and did not operate.

**Other:**

1. For undetermined reasons, both occupants of the aircraft left the accident site shortly after the crash without the available clothing or survival equipment and without leaving notification of their intentions.

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## CESSNA 172 SKYHAWK C-FUYP
## TERRACE BAY AIRPORT, ONTARIO
## 21 MAY 1986

BRIEF NUMBER: 86-O/60038 (Accident)
LOCAL TIME: 1330 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 200 | 125 |
| LAST 90 DAYS | 50 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was attempting to land on runway 07, but, because of strong gusty winds, he had difficulty properly aligning the aircraft with the runway. He was about two thirds down the runway and 200 feet in the air when he decided to overshoot. He opened the throttle; however, the engine only sputtered and failed to respond. The aircraft settled in an area of stumps about 200 feet off the right side of the runway.

The pilot had just completed a three and one-half hour flight from Kenora and had made a slow descent from 5,000 feet. The wind was from 060 degrees at 17 to 27 knots.

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## PIPER PA-25 PAWNEE C-GYFB
## ARBORG AIRPORT, MANITOBA
## 24 MAY 1986

BRIEF NUMBER: 86-C60038 (Accident)
LOCAL TIME: 1430 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 737 | .2 |
| LAST 90 DAYS | 10 | .2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot completed one circuit in the aircraft. On landing, he flared the single-place aircraft at about 10 feet above ground level; the aircraft stalled, then touched down heavily, and the main gear collapsed. The aircraft skidded approximately 25 feet, coming to rest at the edge of the runway. This was the pilot's first flight in a PA-25.

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## PIPER PA-12 SUPERCRUISER N2357M
## NORTH BATTLEFORD, SASKATCHEWAN 25 mi S
## 24 MAY 1986

REPORT NUMBER: 86-C60901 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1350 CST
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,312 | 250 |
| LAST 90 DAYS | 48 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft had been sold and was being flown from Alaska to Maine for delivery to the new owner. The pilot and passenger departed from Villeneuve, Alberta, intending to conduct a visual flight rules (VFR) flight to Saskatoon, Saskatchewan as one leg of the journey. Two hours and 40 minutes into the flight, the engine lost all power, and the pilot conducted a successful forced landing onto a road. He checked the aircraft over, sampled the fuel, and found nothing wrong. The aircraft engine was started and ran normally at several power settings for seven to eight minutes. The pilot then took off, intending to complete this leg of the journey. The aircraft had climbed to approximately 4,500 feet when, once again, the engine lost all power. The pilot attempted a forced landing to a roadway, but, on final approach, the aircraft struck a power line and crashed into a ditch beside the road.

The aircraft was equipped with a right and a left fuel tank, each with a capacity of 19 U.S. gallons. The tanks were topped up at every stop along the journey. The previous leg took three hours, and the refuelling slip from Villeneuve showed that 17.6 U.S. gallons were pur-

chased, indicating a consumption rate of approximately six U.S. gallons per hour. The manufacturer's specifications state a consumption rate of 6.5 U.S. gallons per hour in cruising flight.

The fuel selector system was examined after the accident. The right fuel selector valve appeared to be selected on; however, the valve seemed to be closed. The right tank selector handle had prescribed marks on the fuel selector panel through 360 degrees of rotation. Normal operation for the fuel selector handle prescribes an arc of 90 degrees of travel from the off to the on position. The fuel selector valve was removed, disassembled, and inspected, and the internal valve core was found to be closed (off). The selector handle connecting pin had corroded, disconnecting the handle from the valve core; this condition had existed for some time. All other aspects of the fuel supply system were checked; no faults were found.

The aircraft fuel system provides a vent line between the left and right main fuel tanks. The vent port is located in the upper forward corner of the inboard side of each tank. If the fuel level is high in the tank and the aircraft assumes a nose-down attitude, the tank vent port becomes submerged in fuel. If one of the tanks is low on fuel when this condition occurs, fuel in the full tank produces a head pressure, causing fuel to be transferred to the low-quantity tank.

The faulty fuel selector valve meant that only fuel from the left tank was available. As fuel was used for the engine start, run-up, and take-off from Villeneuve, plus 2.7 hours of flight time, the initial power loss was due to fuel starvation after the left tank was exhausted. During the descent, fuel drained from the right tank to the header tank, and this provided sufficient fuel for a ground run, take-off, and climb-out, before the engine again lost power due to fuel starvation.

The pilot took off on the accident flight even though he had not determined the cause of the previous power loss.

*FINDINGS:*

**Cause Related:**
1. The engine lost all power as a result of fuel starvation because of the faulty right tank fuel selector valve.

2. The pilot took off without determining the cause of a previous power loss.

3. While the pilot was attempting a forced landing, the aircraft struck a power line and crashed into a ditch.

**Other:**
- Nil -

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## PITTS S2A SPECIAL C-FDIP
## MARKHAM, ONTARIO 1 mi SE
## 24 MAY 1986

REPORT NUMBER: 86-O60039 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1535 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 815 | 591 |
| LAST 90 DAYS | 30 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The pilot and one passenger were on a local pleasure flight. About 35 minutes after take-off, the engine lost power, and a forced landing was carried out on a golf course. During the landing roll, the aircraft struck a tree.

This was the third flight since the aircraft had been refuelled. Examination revealed that the fuel tank was empty. The aircraft had a fuel capacity of 24 U.S. gallons, which was considered sufficient for two hours of flight. Although the three flights had a totalled air time of only 1 hour and 35 minutes, the taxiing, run-ups, take-offs, and climbs had consumed additional fuel which had not been considered when estimating the fuel duration of two hours.

*FINDINGS:*

**Cause Related:**
1. The engine failed due to fuel exhaustion.

**Other:**
-Nil-

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## CESSNA 180 SKYWAGON C-GWLD
## HUMBOLDT, SASKATCHEWAN
## 25 MAY 1986

BRIEF NUMBER: 86-C60036 (Accident)
LOCAL TIME: 1045 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 340 | 48 |
| LAST 90 DAYS | 13 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was taking off from a hard-surfaced runway, and, as the tail was raised, the aircraft swung to the left. The pilot rejected the take-off, the right outboard landing gear bracket failed, and the aircraft came to rest off the side of the runway.

The cross-wind component was 70 degrees at a speed of 10 to 15 miles per hour.

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## CESSNA 180 SKYWAGON C-GAPM
## FORT MCMURRAY, ALBERTA
## 26 MAY 1986

REPORT NUMBER: 86-W60014 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1600 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 420 | 200 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot experienced difficulty maintaining directional control after landing on runway 07. The aircraft drifted left and then swung right. The left wing contacted the runway, and the aircraft nosed over.

The wind at the time the landing clearance was issued was 120 degrees magnetic at nine knots, but according to the official weather observations at 1600 MDT, wind gusts to 17 knots were reported. There was no communication between the tower and the aircraft after the landing clearance was issued. The peak gusts were beyond the maximum demonstrated cross-wind component of 10 knots.

Approved oversized tires had been installed by the pilot, but there was no entry in the aircraft log-book to record this work. The wheel fairings were left off because they did not fit with the larger tires, but the attachment brackets had not been removed. Standard aircraft practice requires removing the entire wheel fairing installation, not just part of it. The on-site investigation showed that the left tire and bracket had made contact during the right turn. The nominal clearance between the oversized tire and the bracket was about one quarter of an inch.

During the roll-out, the pilot could not maintain directional control because of during the gusty cross-wind conditions. As the aircraft swung to the right, side loading on the left tire induced a sidewall bulge that stopped the rotation of the wheel when the tire contacted the bracket; as a result, the wheel locked, and the left wing contacted the runway. The clearance between the oversized tires and the bracket was insufficient.

***FINDINGS:***

**Cause Related:**
1. The wheel fairing brackets were not removed to accommodate the oversized tires.

2. The clearance between the oversized tires and the bracket was insufficient.

3. During the landing roll, the pilot could not maintain directional control because of the gusty wind conditions.

**Other:**
1. There were no entries in the aircraft log-book to record the tire change.

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## CESSNA A188B AGWAGON C-GGMW
## HAZLET, SASKATCHEWAN 6 mi NW
## 29 MAY 1986

REPORT NUMBER: 86-C60040 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1120 CST
OPERATION: Private Aerial Spray
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,480 | 400 |
| LAST 90 DAYS | 100 | 23 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

### *HISTORY OF THE FLIGHT:*

The aircraft was engaged in a crop spraying operation. As the aircraft approached mid-field on a southerly pass, the pilot advised ground personnel that he had two passes to complete before the load of chemical was depleted. Witnesses saw the aircraft fly to the south end of the field, climb steeply to about 200 feet above ground level (agl), then enter a hammerhead turn to the left. In the last third of the turn, the aircraft entered a left spin and struck the ground in a vertical attitude. The pilot sustained fatal injuries.

### *PERTINENT INFORMATION:*

The accident occurred on an open pasture, about 35 feet beyond the southern end of the cultivated field. The weather was suitable for visual flight rules (VFR) flight; the wind was out of the southwest at 10 knots, and the temperature was approximately 30 degrees Celsius.

No pre-flight aircraft discrepancies were reported, and no evidence of structural or mechanical failure/malfunction was found.

Post-mortem examination revealed no pertinent medical factors. An assay to detect exposure to Decis, the chemical in use, was not available; however, Decis is considered to have a low hazard rating, and the pilot did not participate in the mixing or loading of the chemical. He was not wearing protective clothing or using a respirator.

The pilot had had about six hours sleep the previous night, rising around 0400. The accident occurred during his sixth flight of the day. The Aerial Application of Pesticides Safety Manual states: "Given proper chemical safeguards, acute pesticide toxicity should not be a major risk; but even mild exposure can cause a dangerous increase in fatigue" and "the distraction of feeling ill or weary, together with the dulling of perception and motor responses, can easily prove fatal when the demand is for peak performance."

Reportedly, the pilot had performed hammerhead turns in various aircraft types and had done so in the A188B on many occasions. None of the witnesses interviewed had seen him attempt this manoeuvre at less than 500 feet agl.

### *FINDINGS:*

**Cause Related:**
1. The pilot initiated a hammerhead turn at very low altitude and lost control of the aircraft.

**Other:**
-Nil-

## CESSNA 172G C-FVBI
## HAUTE-RIVE, QUEBEC
## 31 MAY 1986

BRIEF NUMBER: 86-Q60017 (Accident)
LOCAL TIME: 0930 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 150 | 60 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *REPORTED CIRCUMSTANCES:*

The pilot, with one passenger, was returning from a local flight. On approach to runway 05, the pilot lost control of the aircraft because of a violent downdraft, and the aircraft crashed in the final approach area. The wind was blowing across the runway at about 10 knots.

## CESSNA 172 C-GHTU
## BEAVERDELL, BRITISH COLUMBIA
## 31 MAY 1986

REPORT NUMBER: 86-P60021 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1850 PDT
OPERATION: Specialty Recreational Flying
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,025 | 2,025 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 2 | 1 | - |

### *HISTORY OF THE FLIGHT:*

The pilot was taking passengers up for sightseeing flights, and about 15 minutes after take-off on the last planned flight of the day, the aircraft flew down the West Kettle River below tree-top level. The aircraft pulled up into a steep climbing left turn then suddenly descended and crashed in an inverted position in a sawmill yard. The pilot and two of the three passengers were fatally injured.

### *PERTINENT INFORMATION:*

The pilot was charging passengers for flights at the Beaverdell High Water Day Fair. The flights, which began at 1030 PDT, were flown from a gravel strip located one mile north of the village. As the day progressed, the flights were described by witnesses as being a little more dangerous each time the pilot went flying.

The aircraft had struck the ground in an inverted, nearly vertical attitude. The aircraft was serviceable prior to ground impact. The aircraft fuel on board had seeped into the ground, and insufficient fuel was available for analysis. The small amount of fuel remaining was free of water. The engine was dismantled at an authorized engine overhaul facility and found to be serviceable.

Medical examination revealed that the pilot's blood alcohol level was 211 milligrams per cent. The pilot had been seen drinking beer early in the afternoon at the beer tent, and he was observed in the beer tent between flights. Air Regulation 409 states that alcoholic beverages shall not be consumed by a crew member within eight hours prior to a flight, and no person shall act as a crew member while under the influence of alcohol. One full and five empty beer bottles were found in the cockpit and on the ground at the accident scene.

### *ANALYSIS:*

The alcohol level in the pilot was sufficient to cause impairment of his normal flying capabilities. As the day progressed and more alcohol was consumed, the pilot flew the aircraft lower and in a more dangerous manner, indicating a progressive loss of judgement. The final pull-up, which resulted in what appeared to be a stall, indicated an impairment of motor coordination.

### *FINDINGS:*

**Cause Related:**
1. The pilot's ability and judgment were impaired by alcohol.

**Other:**
-Nil-

## CESSNA 150 CF-LKZ
## AUTHIER, QUEBEC
## 01 JUNE 1986

BRIEF NUMBER: 86-Q60018 (Accident)
LOCAL TIME: 1610 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 174 | 159 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *REPORTED CIRCUMSTANCES:*

Returning from a two-hour local pleasure flight accompanied by his daughter, the pilot landed eastward on his 2,000-foot private runway. Because of a cross-wind, he executed the manoeuvre without flaps and at a higher than normal speed. After touching down about 500 feet from the threshold, the aircraft bounced a number of times, and the nosewheel strut broke. The aircraft then slid nose down about 100 feet and nosed over.

CESSNA 185 C-GADY
MOUNT LOUGHEED, ALBERTA
06 JUNE 1986

REPORT NUMBER: 86-W60016 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: Unknown
OPERATION: Private Other
DAMAGE: Destroyed
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 9,800 | 2,600 (estimated) |
| LAST 90 DAYS | Unknown | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 2 | - | - |

***HISTORY OF THE FLIGHT:***

At 1753 mountain daylight time (MDT) on 06 June 1986, a privately owned Cessna 185, C-GADY, departed Calgary International Airport on a search for a missing Cessna 182RG, C-GLYJ. On board the Cessna 185 were the pilot and two passengers.

Upon reaching the search area, the pilot of C-GADY was in radio contact with the pilot of another search aircraft, C-GTIX. They discussed the search areas allotted to their aircraft.

At approximately 2000 MDT, a Canadian Forces search aircraft, Rescue 804, was in contact with both aircraft, and, about that time, C-GTIX left the search area, returning to Calgary. At approximately 2140 MDT, the pilot of Rescue 804 encountered low clouds and showers and returned to Calgary. There was no further communication with C-GADY, and the aircraft failed to return from the search.

A search for C-GADY was carried out in conjunction with the search for C-GLYJ. The wreckage of C-GADY was located by a ground search party at 1415 MDT on 09 June 1986 at lat 50°57'N, long 15°15'W. It had struck a 10,000-foot mountain just below its summit and tumbled down the nearly vertical face to the 7,500-foot level. The three occupants died in the crash.

***PERTINENT INFORMATION:***

The pilot, who was experienced, was reported to have been in good health and to have had an adequate rest on the evening prior to the flight. There were two other pilots on board C-GADY. One of these pilots was familiar with the area to be searched and had an undetermined amount of mountain flying experience.

Prior to departure from Calgary, the aircraft's fuel tanks were filled with 100/130 avgas. The aircraft was equipped with fully functional dual controls. The aircraft was suitably equipped for flight under instrument meteorological conditions. The aircraft's weight and balance could not be established at the time of the accident; however, it was within both limits upon departure from Calgary. The last entry in the technical log book was in November 1985. There was no outstanding discrepancies noted. The journey log book was destroyed during the accident.

The aircraft was totally destroyed except for some of the left wing, which was crushed chordwise from the leading edge back to the trailing edge in such a manner that it left several convolutions in the skin. These convolutions were parallel to the leading and trailing edges, indicating that the aircraft flew directly into the mountain face. No evidence was found to indicate that a mechanical failure had contributed to the occurrence. The aircraft was equipped with a fixed emergency locator transmitter (ELT); however, it was damaged in the crash to the extent that it failed to operate.

There is no official weather reporting station in the Kananaskis valley area. Environment Canada, Atmospheric Environment Services provided the following Calgary and Kananaskis area weather report, valid for the period from 1200 to 0000 MDT on 06 June 1986: a quasi-stationary upper ridge centred along the divide from western Montana to southeastern Yukon was giving a moist unstable air mass over all of southern Alberta.

Instability cloud increased early in the day, and, by 1200 MDT, all stations in southwestern Alberta and southeastern British Columbia were reporting towering cumulus or cumulonimbus. Calgary radar indicated cloud tops to 30,000 feet, and pilot reports placed some tops to 35,000 feet. The 0600 and 1800 MDT radiosonde observations for Edmonton, Vernon, and Great Falls were used to determine the wind and temperature at the 9,000-foot level; the wind was estimated to be from 240 degrees true at 10 knots, and the temperature was plus two degrees Celsius.

Several other sources were checked regarding the area weather. At 2045 MDT, an Alberta Forestry look-out tower technician on Mount Kidd reported seeing what he believed to be C-GADY flying at the tower's 7,000-foot elevation, in a northwesterly direction toward an area of deteriorating weather. C-GADY was found approximately five miles northwest of Mount Kidd.

A company pilot, flying a light twin on the search for C-GLYJ stated that rain and several cumulonimbus clouds were moving through the search area, greatly reducing the visibility. The cloud base in the area was generally 9,000 to 9,500 feet above sea level with good visibility below the cloud, except in the rain where the visibility was reduced to about half a mile. There were some updrafts and downdrafts of approximately 1,000 feet per minute. By 2000 MDT, the company pilot had moved east to the foothills where frequent rain showers reduced the visibility to less than half a mile, and the ceiling was 6,000 to 7,000 feet.

Rescue 804 encountered low cloud and showers at approximately 2100 MDT, whereupon the pilot terminated the search. A helicopter, C-GJEL, ceased flying operations in the Canmore area shortly after 1800 MDT because of winds and weather. Another helicopter ceased flying at 2137 MDT, again because of deteriorating weather. Canmore is located 13 miles northwest of the accident site. Lightning detector plots for the Kananaskis area on 06 June 1986 from 1800 to 2300 MDT showed a total of 202 strikes in the area, confirming the presence of cumulonimbus activity in the search area.

The aircraft was found at the south end of a valley, which is about three-quarters of a mile wide and about two and one-half miles long. The valley floor is approximately 6,600 feet above sea level, while the valley wall on the east and west sides are 7,800 and 8,500 feet above sea level, respectively. The south wall of the valley is Mount Lougheed, which rises from the valley floor to over 10,000 feet above sea level.

*ANALYSIS:*

It was not determined why the aircraft struck the mountain top; however, pilot incapacitation was unlikely as there were two passengers on board who held pilot licences, and the aircraft was equipped with fully functional dual controls.

Weather was moving into the prime search area by 1800 MDT. As the evening progressed, the weather deteriorated to the extent that all other search aircraft returned to their base by 2137 MDT.

Because of the urgency of the search and the impending darkness, the pilot may have felt exceptional pressure to continue the flight despite the deteriorating weather, in the hope that they would find C-GLYJ.

*FINDINGS:*

**Cause Related:**
1. The cause of this accident was not determined.

**Other:**
-Nil-

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## CESSNA 172M C-GLDV
## SISSON RIDGE, NEW BRUNSWICK
## 07 JUNE 1986

REPORT NUMBER: 86-A60017 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1915 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 400 | 65 |
| LAST 90 DAYS | 60 | 60 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

Just after the aircraft became airborne from a private 2,900-foot airstrip, the pilot sensed a change in engine (Lycoming 0-320-E20) rpm. Thinking that the engine might stop, and with about 1,800 feet of runway remaining, the pilot elected to land straight ahead. The aircraft, which had drifted to the right after becoming airborne, touched down on the edge of the runway on a heading five degrees right of the runway heading. The pilot was unable to keep the aircraft on the runway. The aircraft ran down a gentle slope at the side of the runway, and the nose gear broke off when it struck a mound of earth around a gopher hole. The aircraft skidded along for another 120 feet before coming to rest.

The wind was from 210 degrees at 15 to 20 knots, creating a left cross-wind component.

During the ground run-up prior to take-off, a higher than acceptable magneto drop was noted on both magnetos. The magnetos were rechecked after a full-power run-up and checked again after taxiing to position for take-off. Each time the magnetos were rechecked, the rpm drop was found to be within acceptable limits.

Examination of the engine and fuel system did not reveal any defects except that the bottom spark plugs on all four cylinders had some lead deposits around the ceramic insulators. The engine is rated to operate on fuel with a minimum octane rating of 80/87. In this case, an approved alternate higher octane fuel (100/130) was being used. The spark plugs are more susceptible to lead fouling on a higher octane fuel, especially during ground operations at low power settings.

The aircraft drifted to the right after take-off because of a cross-wind from the left. Because of the aircraft heading at touchdown, and the left cross-wind, the pilot was unable to prevent the aircraft from departing the runway. It was not determined what caused the change in engine rpm; however, there are two possibilities:

1. Deposits around the ceramic insulators on the spark plugs could have caused a decrease in engine rpm; or

2. The spark plugs may have been slightly lead fouled when the take-off run was started. During the take-off, with the engine at full power, the lead may have burned off, resulting in an increase in engine rpm.

*FINDINGS:*

**Cause Related:**
1. Changes in engine rpm occurred for undetermined reasons.

2. The pilot allowed the aircraft to drift to the right on take-off.

3. After touchdown, the pilot was unable to keep the aircraft on the runway because of the strong left cross-wind.

**Other:**
- Nil -

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## NORTH AMERICAN AVIATION NAVION C-GXZX OTTAWA INTERNATIONAL AIRPORT, ONTARIO 07 JUNE 1986

REPORT NUMBER: 86-O/60044 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1544 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 303 | 200 |
| LAST 90 DAYS | 9 | 9 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The aircraft took off from runway 04 for a local flight. During the climb-out, at a height of approximately 100 feet, the engine lost all power. The pilot did not think there was sufficient distance remaining before the airport boundary fence to land safely straight ahead; so he attempted to force-land the aircraft on Tango taxiway, which runs perpendicular to the end of runway 04. While the aircraft was in a right turn to line up with the taxiway, the right wing tip struck the ground, and the aircraft cartwheeled, coming to rest 170 feet short of Tango taxiway on the infield between runway 04 and Quebec taxiway. The pilot was seriously injured.

The aircraft was equipped with two fuel selectors. The main fuel selector is used to select main tank feed, auxiliary tank feed, wing tip feed or off. When wing tip feed is selected, the second selector is used to select both tip tanks, left tip tank, or right tip tank only.

Examination of the aircraft revealed that the main fuel selector was in the tip tank position, and the second selector was in the left tip tank position. Both wing tip fuel tanks were found empty, and the fuel lines from the tip tanks to the fuel selector valve were empty. The main fuel tanks contained approximately 20 gallons of fuel, and the fuel line from the collector tank to the main fuel selector valve was full of fuel. No fuel was found in any part of the fuel system forward of the main selector valve, except for approximately one-quarter of an ounce of fuel remaining in the gascolator bowl. There were no malfunctions found with the fuel selector valve.

Examination of the engine did not reveal any pre-impact failures or malfunctions.

The pilot reported that he had started the engine and carried out the initial run-up with the main fuel selector in the wing tip position and the second selector in the left tip tank position. While taxiing, he selected the main tanks and performed another run-up before take-off. When the engine quit during the climb-out, the pilot attempted to restart the engine, and, during these attempts, the left tip tank was reselected. While the aircraft was in the right turn to line up for Tango taxiway, the pilot felt the aircraft becoming "mushy", and, realizing that the aircraft was close to stalling, he pushed the control column forward. At that point, the aircraft struck the ground.

The absence of fuel forward of the selector valve indicates that the engine power loss was due to fuel starvation. The cause of the fuel starvation could not be determined; however, because fuel was found in the supply line from the collector tank to the selector valve, and because no fuel was found after the selector valve, it is likely that the problem occurred because of improper fuel selection.

Because the engine stopped at low altitude, there was insufficient time in which to complete the turn to a safe landing area.

*FINDINGS:*

**Cause Related:**
1. The engine power loss was due to fuel starvation.

2. Because the engine stopped at low altitude, there was insufficient time in which to complete the turn to a safe landing area.

**Other:**
-Nil-

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## CESSNA 172H C-GLCX
## HARBOUR GRACE, NEWFOUNDLAND
## 08 JUNE 1986

REPORT NUMBER: 86-A60018 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1144 NDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 100 | 5 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 3 | - |

*HISTORY OF THE FLIGHT:*

The aircraft, which was being used for skydiving operations, was departing runway 09 with the pilot and three jumpers on board. After a ground roll of between 800 to 1,000 feet, the aircraft veered right about 20 degrees. The aircraft cleared a five-foot-high steel cable fence and, on climb-out, contacted a 30-foot-high spruce tree, first with the right wing and then with the right horizontal stabilizer. The aircraft continued flying, turning gradually to the left through approximately 180 degrees, and then stalled and crashed, coming to rest in an inverted position. All of the occupants were seriously injured.

*PERTINENT INFORMATION:*

The aerodrome, which is unlicensed and does not meet licensing requirements, has a 4,000-by-200-foot grass-surfaced runway and is aligned 09/27. A five-foot-high steel cable fence surrounds the runway to prevent wildlife from entering the area. The distance of the fence from the edge of the runway varies from 5 to 10 feet. There are many trees scattered around the runway just outside the fence. The tree which was hit by the aircraft was located just outside the fence and 1,400 feet down the runway. The runway has many rough spots and humps, and the grass had recently been cut; however, the runway was satisfactory for the intended operation.

The weather was good, with scattered clouds, visibility was more than 15 miles, and the wind was from the north at 5 to 10 knots. The wind was 90 degrees to the runway from the left.

The pilot had five hours on type, had limited experience on grass/field operations, and had not flown for two months.

On take-off, the pilot did not apply into-wind aileron until after the aircraft had veered, and he raised the nosewheel off the ground early in the take-off roll as part of his rough-field take-off procedure. He did not correct the swing with opposite rudder and continued the take-off because he felt he would hit the boundry fence if he aborted.

Post-accident investigation of the aircraft revealed that only one seat had been installed; seat-belts were present; the right door had been removed for the skydiving operation; the flaps were up; the leading edge of the right horizontal stabilizer was crushed rearward four inches; and the entire stabilizer was displaced rearward so that the elevator was jammed in a nose-up position. The crash forces were severe enough to cause serious injuries to all four occupants. The pilot was wearing his seat-belt, the others were not. The crash dynamics were such that serious injury was inevitable, regardless of seat-belt status.

*ANALYSIS:*

Investigation of this accident centred around the loss of directional control on take-off. Specifically, why the aircraft swung to the right in a left-hand cross-wind.

In a cross-wind take-off, the aircraft tends to both weathercock into the wind and drift laterally with the wind. The correct cross-wind technique involves maintaining the desired direction with rudder while maintaining lateral control by deflecting the ailerons toward the wind. Heavy cross-winds turn an aircraft into wind; however, in light cross-winds a swing can develop out-of-wind. This phenomenon is not widely understood by low-time pilots.

In light cross-winds, the nosewheel keeps the aircraft straight, but the aircraft has a tendency to drift laterally. If the pilot does not apply into-wind aileron, a left-hand cross-wind causes the aircraft weight to shift to the right main wheel. The weight shift causes the aircraft to pivot around this wheel, introducing a right turn instead of the anticipated left turn. The pilot counteracts the tendency to turn by using rudder control.

If the pilot lifts the nosewheel off the runway early in the take-off roll to minimize the impact of a rough surface, the cross-wind effect changes. This action reduces the nosewheel steering effectiveness, and the aircraft now has a greater tendency to weathercock rather than drift. The pilot requires large rudder deflections to maintain directional control. With a left-hand cross-wind, the pilot deflects the rudder to the right. If the nosewheel contacts the ground, such as would happen when the aircraft travels over a hump or into a depression, the nosewheel steering would induce a turn to the right. The pilot must react by reducing the rudder amount appropriate for the nosewheel steering.

The pilot applied insufficient aileron and lifted the nosewheel off the ground early in the take-off roll. A combination of these two factors caused the aircraft to swing to the right in a left-hand cross-wind. Because the elevator jammed in the nose-up position, the aircraft stalled.

Investigators were unable to determine why the pilot did not realign the aircraft with the runway heading and complete a normal take-off.

*FINDINGS:*

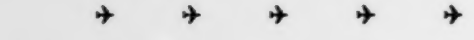
**Cause Related:**

1. A combination of the cross-wind technique and the rough-field technique used by the pilot resulted in a loss of control.

2. The aircraft hit a tree after take-off, damaging the horizontal stabilizer and jamming the elevator in a nose-up position, causing the aircraft to stall.

**Other:**

1. The unlicensed aerodrome did not meet licensing standards because of the obstructions near the runway.



CANADIAN AG-AIR SERVICES
DROMADER PZL M18A N4609P
ELTRUT LAKE, ONTARIO
09 JUNE 1986

BRIEF NUMBER: 86-C60902 (Accident)
LOCAL TIME: 1915 CDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,491 | 10 |
| LAST 90 DAYS | 24 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot was conducting his first aerial spray flight and first flight on type with a heavy load. The take-off attempt was from a gravel road with soft sand shoulders on either side. Prior to rotation, the right wheel sank into the sand, and the pilot was unable to maintain directional control. The aircraft left the road, shearing both main landing gear and damaging the propeller. The wind was less than five knots.

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MAULE M4-210C C-FQJR
BARRHEAD, ALBERTA 9 mi SE
10 JUNE 1986

REPORT NUMBER: 86-W60020 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2330 MDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 657 | 65 |
| LAST 90 DAYS | 60 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The private pilot was on a visual flight rules (VFR) flight from Grande Prairie to the Edmonton Municipal Airport. Adverse weather was encountered en route, and the pilot landed at Barrhead and waited until a thunderstorm had dissipated. When the weather improved, he took off for Edmonton. About nine miles southeast of Barrhead, at an altitude about 3,000 feet above ground level, the aircraft engine (Continental IO-360-A) lost all power. The pilot selected the left fuel tank, turned the fuel boost pump on, and set the mixture control to full rich. As the aircraft descended, three short bursts of power were experienced, but no sustained engine operation. A night forced landing was carried out on a narrow gravel road, and the aircraft was substantially damaged.

Examination of the aircraft at the accident site disclosed that the right fuel tank was completely empty and the left tank contained seven Imperial gallons of gasoline; gasoline was also present throughout the fuel injection system. After the accident, the engine was started without difficulty and was run up to normal operating limits.

When the right tank ran dry, air entered the fuel injection system, and the engine stopped. Although the pilot selected the left fuel tank which contained fuel, the engine failed to restart because there was not enough time for all the air to be purged from the fuel injection system.

*FINDINGS:*

**Cause Related:**
1. The engine lost all power because of fuel starvation when the right tank ran dry.

2. The engine failed to restart when selected to the left tank, because there was insufficient time to purge all air from the fuel injection system.

**Other:**
-Nil-

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CESSNA 180J SKYWAGON N7577K
WHITEHORSE AIRPORT, YUKON TERRITORY
10 JUNE 1986

BRIEF NUMBER: 86-W60902 (Accident)
LOCAL TIME: 1925 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,542 | 972 |
| LAST 90 DAYS | 41 | 37 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*REPORTED CIRCUMSTANCES:*

The pilot landed on runway 13 Right. The aircraft rolled straight for about 150 feet, then a wind gust raised the right wing, and the aircraft began a swing to the right. Left rudder and brake failed to stop the swing, but full right aileron helped to prevent the left wing from touching the runway. The aircraft travelled a further 300 feet when the left main gear folded under the fuselage, and the left wing struck the ground.

The wind was from 60 degrees to the right at 12 to 20 knots. The aircraft was landed with full flap extended.

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## CESSNA 337G SUPER SKYMASTER C-GWXK
## NAKINA AERODROME, ONTARIO
## 13 JUNE 1986

REPORT NUMBER: 86-O/64092 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2225 EDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,500 | 12 |
| LAST 90 DAYS | 15 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*SUMMARY REPORT:*

When the landing gear was lowered in preparation for landing, the right main landing gear did not fully extend. The pilot made several unsuccessful attempts to lower the gear using both the normal and emergency systems. The landing gear was then retracted, and a wheels-up landing was carried out.

A metal chip of undetermined origin had jammed between the piston and the barrel wall of the right main landing gear hydraulic downlock actuator, thus preventing the downlock pin from retracting. As a result, the right main landing gear travel was limited. The metal chip was similar to the type of cutting produced during metal drilling or machining operations.

*FINDINGS:*

**Cause Related:**
1. A metal chip of undetermined origin in the hydraulic system jammed the downlock actuator and prevented full extension of the right main landing gear.

**Other:**
-Nil-

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## CESSNA P206A STATIONAIR N4650F
## INUKJUAK, QUÉBEC
## 15 JUNE 1986

BRIEF NUMBER: 86-Q60902 (Accident)
LOCAL TIME: 1500 EDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10,000 | 800 |
| LAST 90 DAYS | 300 | 27 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot was taking off from a sand runway when he noticed a fluctuation in the fuel pressure system. He immediately closed the throttle to reject the take-off. The aircraft entered a rutted soft area on the runway and decelerated rapidly. The aircraft then nosed down, and the propeller struck the ground. At the same time, the aircraft contacted a wheel rut which caused the left wing tip to strike the ground.

The pilot had recently landed on the same runway, and he had taxied the entire length of the airfield prior to the attempted take-off, without difficulty. The aircraft was not equipped with balloon tires.

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## PIPER PA-23-250F AZTEC C-GBUI WINNIPEG INTERNATIONAL AIRPORT, MANITOBA 20 JUNE 1986

REPORT NUMBER: 86-C60048 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1037 CDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7,300 | 3,200 |
| LAST 90 DAYS | 185 | 185 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *SUMMARY REPORT:*

When the pilot selected the landing gear down prior to landing at Bevens River, only the main gear indicated down-and-locked. When the gear was reselected down, the same result was obtained, and the pilot diverted to Winnipeg. Prior to the final approach at Winnipeg, the pilot attempted to lower the gear using the hydraulic hand pump, but was unsuccessful. The emergency $CO_2$ system was then activated but also without success. With the gear partially down, the aircraft was landed on the grass alongside a main runway at Winnipeg International Airport.

After the accident, hydraulic fluid was found in the belly of the aircraft and on the tail surfaces. The aircraft was placed on jacks, and the hydraulic system was replenished; when the landing gear was pumped down, a leak was discovered in a hydraulic line running behind the battery. A portion of the flare at one end of the line was melted; in addition, the cable for the emergency landing gear extension system was found to be detached from the release pin on the priority valve.

The emergency system uses air pressure from a $CO_2$ bottle to lower the landing gear. When the system is activated, a cable attached to the priority valve removes a safety pin, thereby freeing the valve; another cable activates the $CO_2$ bottle, providing air pressure to lower the gear.

The damaged hydraulic line accounted for the hydraulic leak which prevented the gear from being extended by the normal method. The remaining hydraulic fluid was pumped overboard when the hand pump was used in an attempt to lower the gear. It is probable that, when the line was being installed, the flared end of the hydraulic line contacted a battery terminal, causing part of the line to melt; the damaged area eventually failed.

The emergency extension system was inoperative because the cable to the release pin on the priority valve was not connected.

### *CONCLUSIONS:*

**Findings:**

1. The landing gear could not be lowered by the normal method due to a hydraulic leak from a damaged hydraulic line.

2. The hydraulic line probably contacted a battery terminal during installation and was damaged.

3. The emergency extension system was not serviceable because the cable to the release pin on the priority valve was not connected.

**Causes:**

The hydraulic line was damaged during installation, and the cable to activate the emergency system was not connected.

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## RISK OF COLLISION BETWEEN: HAWKER SIDDELEY HS125 C-GPPS and UNIDENTIFIED CESSNA 210 VANCOUVER INTERNATIONAL AIRPORT, BRITISH COLUMBIA 7 mi E 22 JUNE 1986

LOCAL TIME: 1546 PDT
INFORMATION SOURCE: Office Investigation

HAWKER SIDDELEY HS125 C-GPPS
REPORT NUMBER: 86-P64046 (Incident)
OPERATOR: Canadian Conference of Teamsters
OPERATION: Private Company Business
DAMAGE: Nil
PILOT LICENCE: Airline Transport

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 11,500 | 1,000 | 5,500 | 53 |
| LAST 90 DAYS | 100 | 96 | 53 | 53 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 3 |
| PASSENGERS | - | - | 2 |

UNIDENTIFIED CESSNA 210 - No Information Available

***HISTORY OF THE FLIGHT:***

C-GPPS was on an instrument approach to runway 26 at Vancouver International Airport. The aircraft was nine miles from touchdown, when air traffic control (ATC) advised the flight of an unidentified aircraft at its one o'clock position at five miles. One minute later, ATC reported that the traffic was now at a one-thirty position, at a mile and a half. The crew of C-GPPS saw the aircraft approaching head-on and took evasive action. They reported that the other aircraft was a single-engine Cessna.

***PERTINENT INFORMATION:***

ATC had tracked the Cessna on radar prior to the incident and was aware of the aircraft's position but not its altitude. The aircraft approached Vancouver from the U.S.A. but did not contact any ATC agency in the Vancouver area. It flew in the controlled airspace of the Vancouver International Airport and the Vancouver harbour area. Following the incident, the Cessna departed Canadian airspace to the south of Vancouver and was never identified.

The weather at the time of the incident consisted of scattered cloud at 4,000 feet with visibility 15 miles in light rain showers.

***ANALYSIS:***

The air traffic controllers, although not contacted by the Cessna aircraft pilot, were aware of the potential conflict and issued timely warnings to the crew of C-GPPS. The crew, using this information, located the Cessna and avoided a collision.

***FINDINGS:***

**Cause Related:**
1. An unidentified Cessna aircraft crossed the approach path of the active runway at Vancouver International Airport without contacting the appropriate ATC authority.

**Other:**
-Nil-

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## CESSNA 180 SKYWAGON C-FHSF
## EARLTON AIRPORT, ONTARIO
## 23 JUNE 1986

BRIEF NUMBER: 86-O/60050 (Accident)
LOCAL TIME: 1510 EDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,700 | 1,500 |
| LAST 90 DAYS | 150 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The aircraft landed on runway 25 at Earlton, and, during the landing roll, the right wing lifted unexpectedly. The pilot tried to lower the wing and raised the flaps, but the aircraft remained in a right-wing-high attitude and continued rolling down the runway on the left main wheel only. The aircraft then veered sharply to the right, and the left main gear failed. The aircraft came to rest on the runway.

The aircraft was equipped with a very high frequency transceiver, but it was not serviceable. The wind reported by the pilot was from 270 degrees at 10 to 15 knots. A special report issued 15 minutes after the accident reported the wind from 340 degrees at 20 to 28 knots.

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## BELLANCA 8GCBC SCOUT C-GBMP
## WARNER, ALBERTA 22 mi E
## 23 JUNE 1986

REPORT NUMBER: 86-W60022 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2000 MDT
OPERATION: Private Aerial Spray
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 600 | 300 |
| LAST 90 DAYS | 22 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The pilot was spraying insecticide (furadan) on his property, using his own private strip for take-off and landing. When the pilot did not return from a spray run a search was initiated, and the wreckage was located about one-half mile from the airstrip. The aircraft was destroyed, and the pilot suffered fatal injuries.

***PERTINENT INFORMATION:***

The aircraft had contacted the ground with the left wing tip, cartwheeled onto its nose, and then slid sideways about 25 feet to a stop. The feathers of a bird were found under the aircraft when it was moved. The left cabin window was located 1,200 feet beyond the accident site, ahead of the wreckage trail. The aircraft was being flown at an altitude of about 100 feet with the left window open, as was the normal practice for this operation. This window is hinged at the top and swings out and up, and is held open by a latch on the wing.

The left cabin window and the engine crankshaft were forwarded to the CASB Engineering Laboratory. Examination of blood smears on the forward edge of the frame determined that the open left window had been struck by a bird. This impact force acted on the forward hinge rivets which had been weakened by fatigue precracking, and the window swung aft, breaking the rear hinge. The window fell to the ground virtually undamaged. Trajectory analysis established that the window was lost in flight and was not thrown by impact forces to where it was found.

Furadan is a highly toxic pesticide requiring careful handling; however, there was no reliable evidence as to what handling precautions the pilot observed. Medical examination did not reveal any reason for pilot incapacitation. Although no evidence of toxic exposure to the insecticide was found, the test method used may not have been conclusive.

***ANALYSIS:***

A bird struck the left cabin window which then separated from the aircraft. It is possible that this resulted in the pilot diverting his attention from the operation of the aircraft.

It was not possible to determine whether or not the pilot was affected by the furadan or if incapacitation was a factor.

It was not determined why the engine was operating at low power; however, had an engine failure occurred, the terrain where the accident occurred was suitable for a forced landing.

The following laboratory reports were completed: LP 249/86 - Crankshaft Examination; and LP 251/86 - Window Frame Failure Analysis.

***FINDINGS:***

**Cause Related:**
1. The cause of the accident was not determined.

**Other:**
-Nil-

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## CESSNA 172M SKYHAWK C-GRLY
## GULL LAKE, SASKATCHEWAN 7 mi ENE
## 23 JUNE 1986

REPORT NUMBER: 86-C60053 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1115 CST
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,600 | 500 |
| LAST 90 DAYS | 100 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was spraying the ditch along a municipal road when the aircraft's vertical stabilizer struck a power line. The aircraft then crashed onto the surface of the road and came to rest in an inverted position in a ditch.

The weather was excellent and is not considered to be a factor in the accident. The aircraft was serviceable and had performed well until the wire strike.

To prepare the aircraft for spraying, a spray gear kit designed for the aircraft type was installed. Approval, which is required for each kit installation of this type, had not been applied for in this case. Changes to the weight and balance, as a result of the installation, had not been reported in accordance with applicable regulations. Neither of these factors contributed to the accident.

The pilot had flown similar spray flights in the area; however, he had not flown along the road where the accident took place and the spray area was not surveyed for hazards before the spray flight was initiated. As the aircraft followed the road, at an altitude of 8 to 10 feet above ground, it descended into a wide, shallow depression. The pilot did not see the single-wire power line stretching across his flight path because the line was located across the low point in the depression and blended with the terrain. The aircraft struck the power line about a foot from the top of the vertical stabilizer, causing the aircraft to crash.

***FINDINGS:***

**Cause Related:**

1. The pilot did not survey the spray area for hazards.

2. The pilot did not see the power line across his flight path.

3. The aircraft struck the power line during the aerial spray operation.

**Other:**

1. The change to the aircraft's weight and balance following the installation of the spray kit had not been reported, as required by regulations.

2. The operator had not applied for the necessary approval to install the spray equipment.

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## CESSNA 120 N89486
## CABLE HEAD, PRINCE EDWARD ISLAND
## 24 JUNE 1986

REPORT NUMBER: 86-A60901 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1610 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 510 | 50 |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | 1 | - |

***HISTORY OF THE FLIGHT:***

The pilot and a friend departed Charlottetown, P.E.I. on a local sight-seeing flight. A short while later the aircraft was observed circling a private grass airstrip at Cable Head, 24 nautical miles east of the airport. The aircraft approached the airstrip on a westerly heading, and, on short final, the aircraft propeller clipped the top off a tree. The tail wheel snagged a power line, and the aircraft pitched down and crashed on the button of the airstrip. The pilot was fatally injured, and the passenger was seriously injured.

***PERTINENT INFORMATION:***

The privately owned airstrip had been used regularly for many years by the owner, who operates a Cessna 182 from the field. The airstrip is 2,800 by 100 feet and is a level, mowed, grassed area. On the approach to runway 26, a stand of trees and a paved road run perpendicular to the airstrip. A power line is situated between the trees and the road and is 60 feet off the button of the airstrip. The trees had purposely not been cleared from the approach as they were higher than the power line; if a landing aircraft overflew the trees, then the power line would not be an obstruction. The runway is adequate for Cessna 120 operations.

The wind was 8 to 10 knots with the temperature about 25 degrees Celsius, which created turbulence over the trees. The trees, open fields, wind, and temperature were also likely responsible for updrafts and downdrafts. The passenger reported that the extent of the turbulence surprised them and that additional power was required to maintain controlled flight. He also stated that the aircraft was operating normally.

Because the pilot was not familiar with the airstrip, he circled it before making an approach from the east. The wind was about 20 degrees off the runway heading of 260 degrees. On final approach, the aircraft disappeared from ground view below the tree line that crosses the approach. However, the engine power was heard to increase slightly, and the aircraft reappeared, low over the trees, on short final. At this point, the propeller clipped the top of a 30-foot tree, and the tail wheel snagged the 28-foot-high power line. The power line was displaced about 40 feet before it snapped.

When the tail wheel snagged the power line, the aircraft pitched nose-down and struck the ground on the button of the airstrip. The occupants were removed, with difficulty, by witnesses. The aircraft was not equipped with shoulder harnesses, and the passenger's seat-belt was not fastened.

***ANALYSIS:***

The pilot was unfamiliar with this airstrip, and, because of local wind conditions, permitted the aircraft to get too low on approach. He applied some power but not enough to allow the aircraft to clear the trees and power line. With 2,800 feet of landing surface available, there was no requirement for the approach to be as low as it was.

***FINDINGS:***

**Cause Related:**
1. The aircraft was flown too low on final approach, and, as a result, it contacted trees and a power line on the approach path.

2. The pilot was not familiar with the private airstrip.

3. The passenger's seat-belt was not fastened.

**Other:**
1. Shoulder harnesses had not been installed in the aircraft, nor were they required by regulations.

***SAFETY ACTION:***

**Action Taken:**
Since this occurrence, the owner of the airstrip has entered into negotiations with the Maritime Power Commission concerning the underground burial of the power line across the approach to the runway.

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## PIPER PA-28-140E CHEROKEE N32305
## TSEZIE LAKE, BRITISH COLUMBIA
## 27 JUNE 1986

REPORT NUMBER: 86-P60905 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1245 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (USA)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 335 | 300 |
| LAST 90 DAYS | N/A | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft approached high and fast, floated along the runway, touched down long, and began to porpoise. During the go-around, the aircraft could not climb over the trees at the end of the runway and contact occurred; the aircraft continued flight in a near-stalled condition across the adjacent lake. Rather than risk contact with the trees on the opposite shore, the pilot ditched the aircraft in shallow water. The pilot and his passenger were picked up by boat.

The gravel runway is 2,500 feet long, 3,550 feet above sea level, and there is a lake at either end just beyond the overrun area. The temperature was about 25 degrees Celsius, and the wind was light. The pilot did not report any aircraft failure or malfunction.

Even though the pilot was aware that he was high and fast on the approach, he continued with the landing rather than initiate a timely go-around. When he decided to overshoot, there was not enough room to climb over the trees at the end of the runway. The aircraft struck the trees and continued flight in a near-stalled condition.

***FINDINGS:***

**Cause Related:**
1. The aircraft porpoised on landing because the aircraft was too high and fast on the approach, and the pilot attempted a go-around.

2. The go-around was initiated too late to avoid trees at the end of the runway.

3. Because of insufficient height, the pilot was unable to recover the aircraft from a near-stalled condition, and he ditched the aircraft rather than force-land in a treed area.

**Other:**
-Nil-

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## CESSNA 172 CF-NKT
## GREENWATER PARK, SASKATCHEWAN
## 28 JUNE 1986

**BRIEF NUMBER:** 86-C60056 (Accident)
**LOCAL TIME:** 1030 CST
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 60 | 20 |
| LAST 90 DAYS | 20 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

***REPORTED CIRCUMSTANCES:***

The pilot landed his aircraft at an aerodrome in a provincial park. The touchdown was further down the runway than planned, and, after landing, the pilot was unable to stop the aircraft before it overran the runaway. The aircraft continued through some tall grass and a ditch and then nosed down.

The 1,950-by-50-foot runaway is oriented east/west, and there is a high hill to the north. The pilot estimated that the wind was from the northwest at about 12 knots. He elected to land on the westerly runway and approached at a much higher airspeed than normal because of the cross-wind and an expected wind shear below the hill. The airspeed did not decrease as expected, and the aircraft floated a considerable distance along the runway before it touched down. There was insufficient runway available on which to stop the aircraft before it overran the runway end.

## CESSNA 182 WREN C-FXCD
## HUGHES LAKE, MANITOBA
## 28 JUNE 1986

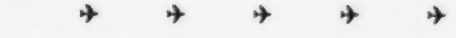
**BRIEF NUMBER:** 86-C60054 (Accident)
**LOCAL TIME:** 1650 CDT
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 145 | 130 |
| LAST 90 DAYS | 30 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot flew two low approaches to a narrow road to determine its suitability as a landing site. Satisfied that it was adequate, he carried out a landing. After touchdown, both wing tips dragged through willows that lined the road. After a short ground roll, the aircraft swung left; the pilot applied full brake but could not prevent the aircraft from running into a ditch that paralleled the road.



## AERONCA CHAMPION 7DC C-FOQH
## LAMBURTUS AIRSTRIP, CHIEF LAKE, BRITISH COLUMBIA
## 03 JULY 1986

**BRIEF NUMBER:** 86-P60036 (Accident)
**LOCAL TIME:** 1930 PDT
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 75 | 3 |
| LAST 90 DAYS | 10 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was on her first solo flight in her newly purchased tail-wheel-equipped aircraft. The first approach was discontinued because the aircraft was not in a posi-

tion to be landed safely. On the next approach, the round out was high. The pilot held the aircraft in the landing attitude until it stalled; the aircraft sank rapidly onto the runway, bounced a few times, then veered off the runway and struck a fence.

The pilot had completed three hours of training with the previous owner and had landed the aircraft twice during the last session. She had required assistance on the first landing and had managed the second by herself. The previous owner was not a qualified flying instructor.

## CHAMPION 7GC SKY-TRAK C-FFWU
## NANAIMO AIRPORT, BRITISH COLUMBIA
## 04 JULY 1986

BRIEF NUMBER: 86-P60052 (Accident)
LOCAL TIME: 2000 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 185 | 18 |
| LAST 90 DAYS | 25 | 18 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *REPORTED CIRCUMSTANCES:*

The pilot found the aircraft battery discharged and decided to start the engine by hand swinging the propeller. As the aircraft was not equipped with a parking brake, the front right main wheel was blocked, the tail wheel turned 45 degrees to the fuselage, and the cockpit controls positioned for the start. Three unsuccessful starts were attempted, and the pilot opened the throttle a little more after each attempt. The engine started and developed enough power to cause the aircraft to roll forward. The aircraft travelled approximately 40 feet before striking the tail of a parked aircraft. The pilot was knocked down by the horizontal stabilizer before he could reach the cockpit.

## AERO COMMANDER 100 CF-QSN
## SPRINGBANK, ALBERTA
## 10 JULY 1986

REPORT NUMBER: 86-W60030 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2030 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student Pilot

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 69 | 21 |
| LAST 90 DAYS | 69 | 21 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### *SUMMARY REPORT:*

The pilot had been conducting local circuit practice for 1 hour and 45 minutes when, at an altitude of 200 feet and while the aircraft was on final approach, the engine suddenly lost power. The pilot glided straight ahead and landed short of the runway. After a ground roll of about 40 feet, the nose gear failed, and the aircraft nosed over.

An inspection of the aircraft after the accident revealed that the engine had lost power because of fuel exhaustion. The pilot had visually inspected the fuel quantity before the flight and had estimated that the tanks were half full. This amount would give an endurance of over two hours in level flight at a power setting for economy cruise. The endurance was reduced substantially in the circuit while the pilot practised touch-and-go landings. The engine had been running normally for 1 hour and 45 minutes from start-up until the power loss on final approach.

The absence of any fuel in the carburettor and only unusable fuel in the tanks after the accident confirmed the loss of power was caused by fuel exhaustion.

### *FINDINGS:*

**Cause Related:**
1. The pilot overestimated the fuel available for the intended flight, and the engine lost power when the fuel became exhausted.

**Other:**
-Nil-

## PIPER PA-22-150 TRI-PACER C-GBJC CUMBERLAND BAY, NEW BRUNSWICK 11 JULY 1986

REPORT NUMBER: 86-A60023 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1710 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 11,800 | 180 |
| LAST 90 DAYS | 110 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The engine stopped just after take-off from a private airstrip. The pilot switched the fuel selector from the left auxiliary tank to the left main tank, and full power was restored to the engine. The aircraft was at a low altitude and struck a tree and crashed before a climb could be re-established. The occupants were not injured; however, the aircraft was extensively damaged.

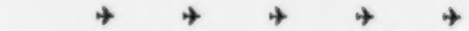
It was the pilot's normal practice to position the fuel selectors on the main tanks for take-off. However, he believed there was sufficient fuel remaining in the auxiliary tanks for the proposed flight, so he elected to take off with the fuel selected to the auxiliary tanks. There is no cockpit warning, nor was the pilot aware of any restriction on the use of the auxiliary fuel tank position for take-off. The owner's handbook only mentions that the pilot should ensure that the fuel is selected to the proper tank for take-off, without explaining which is the proper tank. There were less than four gallons of fuel recovered from the left auxiliary fuel tank.

The pilot had selected the auxiliary tanks for take-off because he had estimated that there were eight gallons available in each auxiliary tank. There should have been sufficient fuel remaining in the left auxiliary tank to allow the engine to continue running; however, the climb attitude of the aircraft may have caused the engine to stop. It could not be determined conclusively why fuel was not being delivered to the carburettor. Although full power was restored to the engine when the fuel was selected to the left main tank, the power was not available in time to prevent the aircraft from striking the trees.

***FINDINGS:***

**Cause Related:**
1. The engine stopped because of fuel starvation; however, the reason for the fuel starvation could not be determined.

**Other:**
-Nil-



## CESSNA 180 SKYWAGON C-FHIJ TORONTO/KING CITY AIRPORT, ONTARIO 13 JULY 1986

REPORT NUMBER: 86-O/60054 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1458 EDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,500 | 15 |
| LAST 90 DAYS | 20 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot departed from a small grass field to ferry the aircraft to a private airport located 10 miles to the east. The pilot landed from the northwest on the 1,960-by-50-foot paved runway. After touchdown and during the landing roll, the pilot retracted the flaps. During the final stages of the landing roll, the aircraft swerved sharply to the right, and the left wing and horizontal stabilizer struck the surface of the runway, resulting in substantial aircraft damage.

Heavy brake marks on the runway indicated that the pilot was using brake to maintain directional control following landing.

At the time of the accident, the weather report for the area indicated that the wind was blowing from 280 degrees at 13 gusting to 18 knots. The pilot chose to land on runway 16 which resulted in a cross-wind component that exceeded that recommended for the aircraft.

***FINDINGS:***

**Cause Related:**
1. During the final stages of the landing roll, directional control was lost, and the aircraft swerved to the right, causing the left wing and horizontal tail to strike the surface of the runway.

2. The direction of the landing resulted in a cross-wind component which exceeded that recommended for the aircraft.

**Other:**
-Nil-



## CESSNA 188B AGWAGON C-GZCI
## CHAMBERLAIN, SASKATCHEWAN
## 17 JULY 1986

BRIEF NUMBER: 86-C60065 (Accident)
LOCAL TIME: 1800 CDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 300 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was returning to the 1,800-foot dirt runway; the winds were blowing from the right at 90 degrees at approximately 20 knots. Near the end of the landing roll, the aircraft veered to the right and nosed over as it crossed a ridge along side the runway edge. The aircraft came to rest in the soft ground adjacent the runway; the propeller and leading edge of the starboard wing were damaged.

The pilot who had never landed in such wind conditions, approached the runway with full flaps. The cross-wind landing limitation chart provided in the Aeronautical Information Publication indicates that the cross-wind component exceeded the aircraft's cross-wind limitation component by approximately nine knots. The runway had recently been graded, and a ridge had been formed along side its edge.



## PIPER PA-28 CHEROKEE C-GMYX
## SASKATOON, SASKATCHEWAN 7 mi N
## 19 JULY 1986

BRIEF NUMBER: 86-C60067 (Accident)
LOCAL TIME: 1500 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 229 | 64 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

During the take-off roll from a grass strip, the aircraft topped a slight incline in the runway, became airborne momentarily, and then settled back onto the strip. Longer grass toward the upwind end of the strip prevented the aircraft from accelerating to take-off speed. The pilot rejected the take-off; however, the aircraft overran the runway and hit some scattered rocks and small bushes.



## BELLANCA 8GCBC SCOUT N5504S
## THOMPSON, MANITOBA
## 19 JULY 1986

REPORT NUMBER: 86-C60903 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1222 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7,600 | 500 |
| LAST 90 DAYS | 50 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft was on a visual flight rules (VFR) flight plan from St. Andrews, Manitoba to Thompson, Manitoba. At 1210, when about 20 miles south of the air-

port, the pilot contacted the Thompson air traffic control tower and was advised that the weather was below VFR limits. He requested and received special VFR clearance into the control zone. At 1218, the pilot reported near the smokestack, a town landmark six miles south of the airport, and stated that he had just flown through some rain showers. At 1220, he advised the tower controller that he could see the airport rotating beacon but had not yet sighted the runway. About one minute later, the aircraft was observed in a turn, descending toward the town. The tower controller attempted to contact the pilot but received no reply. The pilot landed the aircraft on a school yard; the aircraft was substantially damaged as it contacted the ground and slid into a ditch. The pilot was seriously injured.

Rescuers arrived on the scene within minutes of the accident, and the pilot told them that he had carried out a forced landing because the aircraft had run out of fuel. Several witnesses confirmed that the engine had sputtered a number of times as the aircraft descended overhead. Two witnesses stated that the engine stopped before impact.

The aircraft had been fuelled to capacity before departure from St. Andrews. Aircraft endurance was approximately seven hours, and flight time en route was 4 hours and 20 minutes, with two intermediate landings and take-offs. The left fuel tank was ruptured on impact. Fuel was pouring from the damaged right wing when rescue personnel arrived on the scene. Wreckage examination revealed that the fuel lines were unobstructed and the carburettor contained contaminant-free fuel. No engine irregularities which might have contributed to a pre-impact malfunction were discovered.

The reported Thompson weather was 200 feet scattered cloud, estimated 700 feet broken cloud, visibility eight miles in light rain showers, temperature 12 degrees Celsius, and dew point nine degrees Celsius. These conditions were conducive to serious carburettor icing at any power setting. The pilot checked for carburettor ice several times during the flight, but he did not apply carburettor heat while or after flying through the rain showers south of town. He could not recall what emergency procedures he had followed when he realized there was an engine problem. After impact, the carburettor heat control was found in the COLD position.

The aircraft was on a right base for runway 05, about midway between the lit runway and the accident site, when the turn was initiated. On descent to the school yard, the aircraft overflew a large alfalfa field and two unobstructed dirt roads. The pilot did not see either the runway or these other possible landing sites.

The cause of the engine malfunction and stoppage could not positively be determined; however, they most probably resulted from carburettor icing.

***FINDINGS:***

**Cause Related:**
1. The engine sputtered and stopped during flight in conditions conducive to serious carburettor ice formation.

2. A forced landing was carried out on a school yard, and the aircraft was substantially damaged.

**Other:**
-Nil-



LUSCOMBE 8E C-FISZ
LILLOOET, BRITISH COLUMBIA 10 mi S
21 JULY 1986

BRIEF NUMBER: 86-P60037 (Accident)
LOCAL TIME: 1455 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 500 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot side-slipped the aircraft during final approach to a private airstrip and started the landing flare about 20 feet above the ground. While still in a banked attitude to the left, the aircraft touched down hard and bounced. Suspecting damage to the left main landing gear, the pilot overshot and landed at nearby Lillooet, British Columbia. On landing, the left main landing gear collapsed, and the aircraft ground looped.

## CESSNA 172M C-GAMW
## NAPLES, ALBERTA
## 23 JULY 1986

REPORT NUMBER: 86-W60034 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0945 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 369 | 369 |
| LAST 90 DAYS | 6 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

### *SUMMARY REPORT:*

The pilot, with two adults and two children as passengers, departed from his 2,600-foot farm strip to observe flooding of the Pembina River. After viewing local flood conditions, the pilot returned to his strip where he encountered a heavy rain shower, which restricted his visibility. The pilot flew a flapless approach; the aircraft was not lined up with the strip, and the pilot overshot for another circuit. On the second approach, the aircraft touched down one-third of the way down the wet grass strip at about 60 mph. Brakes were applied; however, the aircraft continued off the end of the strip through a fence and over a road, coming to rest in a ditch. The pilot and passengers had to exit through the right door. The left door was jammed and could not be opened.

Heavy rain obscured the pilot's visual references causing him to miss the strip on the initial approach and to touch down long on the second approach. The long landing, combined with the higher speed of a flapless landing and the poor braking action on the wet grass, resulted in the aircraft overrunning the end of the runway.

### *FINDINGS:*

**Cause Related:**
1. The pilot's visual references were obscured by heavy rain, causing him to touch down one-third of the way down the strip.

2. The flapless approach resulted in a higher than necessary touchdown speed.

**Other:**
-Nil-

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## GLAD AIR SPRAY
## PIPER PA-25-235 PAWNEE C-FTTO
## CARMAN, MANITOBA 1 mi S
## 25 JULY 1986

REPORT NUMBER: 86-C60073 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1425 CDT
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 250 | 25 |
| LAST 90 DAYS | 30 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | 1 | - |

### *HISTORY OF THE FLIGHT:*

The pilot of the single-seat spray aircraft was conducting a familiarization flight for the passenger. After takeoff, a normal circuit and a touch-and-go landing were completed, followed by another circuit. After the second touch-and-go landing, the pilot flew the aircraft down the runway, a few feet above the surface, then pulled up in a steep climb and commenced a left turn. At an altitude of 200 to 250 feet above ground level, the aircraft stalled and crashed a short distance from the end of the runway.

### *PERTINENT INFORMATION:*

Fourteen days prior to the accident, the pilot was involved in an altercation and suffered a small, lineal skull fracture. He was discharged from hospital the following day and cautioned not to drive his car. That same day, he flew three times. He continued to fly, but, eight days after receiving the injury, he returned to the hospital complaining of pressure sensations in his head and of dizziness. A diagnosis of traumatic labyrinthitis was made, and he was again cautioned not to drive. He was also informed that the symptoms would take some time to diminish. At no time did the pilot identify himself at the hospital as a pilot, although he was required to do so by regulation. The pilot flew each day following the second diagnosis, including a flight the morning of the accident.

The passenger and pilot had decided to go flying on the spur of the moment. They shared the only seat, sitting side by side, and the seat-belt was not used.

The aircraft struck the ground with the wings level and the nose down at an angle of about 45 degrees. The wreckage was confined to within 20 foot of the crash site, indicating an impact at a low speed and a steep descent angle.

The aircraft was serviceable prior to the accident. The engine and control systems were examined, and no evidence of pre-impact failure was found. The fuel system contained small pieces of RTV silicone rubber sealant which had been used to seat the fuel tank top cover plate during recent maintenance. This type of sealant is not recommended for such use because of its poor chemical resistance to gasoline, but it is not considered to have contributed to the accident.

The weight of the aircraft was less than the maximum allowable. Because of the weight of two people in the only seat, the centre of gravity was calculated to be 1.21 inches aft of the rear limit. This condition was not, however, sufficiently serious to affect the aircraft's flying characteristics.

*ANALYSIS:*

The flight profile of the aircraft just prior to the accident was similar to that of an aerial spray run. During the sharp pull-up and turn, the pilot normally looks around to keep the ground in sight. There is a possibility that the pilot became disorientated when looking around, and he lost control as a result of the effects of traumatic labyrinthitis, but this cannot be stated with certainty.

The wreckage pattern and the reports of the witnesses indicate that the aircraft stalled during the climbing turn, and then crashed as there was insufficient altitude for recovery.

The fact that the pilot was flying when he had been advised on two occasions not to drive and that he carried a passenger in the single-seat aircraft is indicative of very poor judgement, and is contrary to regulations.

*FINDINGS:*

**Cause Related:**
1. During a sharp, climbing turn the pilot lost control, and the aircraft stalled at low altitude.

**Other:**
1. The pilot had suffered a lineal skull fracture and was diagnosed as having traumatic labyrinthitis.

2. The pilot did not notify medical authorities that he was a pilot as is required by regulation.

3. The pilot carried a passenger in his single-seat aircraft, contrary to regulations.

4. The centre of gravity was calculated to be 1.21 inches aft of the rear limit.

5. The fuel tank cover plate was sealed with RTV silicone sealant which is not recommended for this application.

## CESSNA 177B CF-TWJ
## BEAVERSTONE BAY, ONTARIO
## 26 JULY 1986

REPORT NUMBER: 86-O/60059 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1318 EDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,500 | 700 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

While the aircraft was in cruise flight, the engine suddenly began to run extremely rough. The pilot immediately reduced power and found that the engine would run relatively smoothly between 1000 and 1200 rpm, but this power setting was not sufficient for the aircraft to fly to its destination. The pilot intentionally ditched the aircraft in a sheltered bay, in the vicinity of several small boats. The pilot was rescued by occupants of a nearby boat.

When the aircraft was recovered, about six inches of the tip of one of the propeller blades were missing; the blade had failed in the area of a leading edge repair. Laboratory examination of the propeller blade revealed that a fatigue crack had initiated from a file scratch which had been left across the leading edge of the blade, and this crack had progressed until the blade failed. In Federal Aviation Administration (FAA) Advisory Circular AC 43.13-1A (Acceptable Methods, Techniques, and Practices; Aircraft Inspection and Repair) Paragraph

585, Aluminum Propeller Repairs, it is stated that "suitable sandpaper or fine-cut files may be used for removing necessary amount of metal. In each case, the area involved will be smoothly finished with No. 00 sandpaper or crocuss cloth,...." Any nick in the propeller blade, whether from a stone bruise or a file scratch, serves as a stress concentration point and may develop into a fatigue crack. The second part of the repair instructions which requires that file scratches be removed with fine sandpaper had not been carried out, and a fatigue crack had developed, resulting in the blade tip failure.

The following laboratory report was completed: LP 189/86 - Propeller Blade Failure.

***FINDINGS:***

**Cause Related:**
1. The propeller leading edge was not repaired properly.

2. The propeller tip failed as a result of a fatigue crack which originated from a file scratch.

3. The aircraft was intentionally ditched.

**Other:**
-Nil-

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## PIPER PA-28-140 CHEROKEE C-GCKI
## WINNIPEG, MANITOBA
## 27 JULY 1986

**REPORT NUMBER:** 86-C60074 (Accident)
**INFORMATION SOURCE:** Field Investigation
**LOCAL TIME:** 1225 CDT
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 155 | 20 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

During take-off from an abandoned gravel strip, the aircraft became airborne after striking a rock. A cameraman, who had videotaped the take-off, noticed that the left landing gear leg was displaced. By use of hand signals, he directed the pilot not to return to the strip for landing. The pilot flew the aircraft to the Winnipeg Airport where substantial damage was incurred when the left oleo leg failed on landing.

During take-off, the left lower brake housing hit the rock, damaging the oleo leg support structure. The damaged leg separated from the aircraft during the landing sequence.

***FINDINGS:***

**Cause Related:**
1. During take-off, the aircraft struck a rock, damaging the left landing gear support structure.

2. The damaged oleo leg support structure broke away when the aircraft touched down on landing.

**Other:**
-Nil-

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## CESSNA U206 STATIONAIR C-GYUW
## SHERWOOD PARK, ALBERTA
## 31 JULY 1986

**REPORT NUMBER:** 86-W60040 (Accident)
**INFORMATION SOURCE:** Field Investigation
**LOCAL TIME:** 1330 MDT
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 410 | 350 |
| LAST 90 DAYS | 33 | 23 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***SUMMARY REPORT:***

The pilot, with two passengers on board, took off from the Cooking Lake Airport for a 10-minute visual flight rules (VFR) flight to the Edmonton Municipal Airport. About five minutes after take-off, at 800 feet above ground level (agl), the engine (Continental IO 520 D) suddenly lost power. The pilot switched fuel tanks and selected the auxiliary fuel pump on, but there was no response from the engine. A forced landing was carried out in a heavy crop of canola; the aircraft decelerated rapidly for 130 feet and then nosed over.

An on-site examination of the aircraft revealed that the right tank was selected. There was a considerable quantity of fuel in both wing tanks, and the wing vent lines were unobstructed. A strong flow of fuel was obtained from the fuel reservoir drain plugs when the fuel selector was placed to either the left or right tank. Later, the engine was run and found capable of normal operation.

The pilot had completed one 45-minute flight, followed by a 10-minute stop, before commencing the accident flight. Before take-off, the right fuel tank quantity indicator showed 1/4 and the left tank indicator 1/2. The fuel selector was moved to the left tank for take-off.

The National Transportation Safety Board has attributed otherwise unexplained fuel system malfunctions in Cessna 200 series aircraft to unpredictable vapour locking. It could not be determined if a vapour lock caused the engine stoppage in this instance. No mechanical discrepancy was found that would explain the sudden power loss.

***FINDINGS:***

**Cause Related:**
1. The cause of the power loss was undetermined.

**Other:**
-Nil-

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## CESSNA 150 C-GMUF
## CLAIR, SASKATCHEWAN 14 mi N
## 31 JULY 1986

BRIEF NUMBER: 86-C60076 (Accident)
LOCAL TIME: 2050 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 11,000 | 100 |
| LAST 90 DAYS | 100 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was flying at low level so that he could select a suitable landing site in a farm field. Visibility was only fair in the dusky light conditions, and the pilot did not see the power line in his flight path. The nose gear struck the power line, and the aircraft crashed in an inverted attitude.

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## CESSNA 170A C-FMZA
## CALLING LAKE, ALBERTA 15 mi NE
## 01 AUGUST 1986

REPORT NUMBER: 86-W60043 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2030 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 327 | 200 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | 1 | 1 |

***SUMMARY REPORT:***

The aircraft was at 5,500 feet above sea level (asl) on a cross-country flight, when the engine (Continental C-145) lost power and developed an unusual noise. This noise was accompanied by smoke and oil flowing from the left side of the engine cowling. As no suitable landing site was available, the pilot continued the flight until the oil pressure decreased. The engine continued to lose power, and the pilot selected a tree-covered area for a forced landing. The aircraft was substantially damaged, and one passenger sustained back injuries.

The pilot transmitted a distress signal at the first indication of an engine problem and was able to notify another aircraft of his position when he realized that a forced landing was inevitable. After the forced landing, the pilot selected the emergency locator transmitter (ELT) to the ON position and was able to confirm that it was operating by turning on one of the aircraft radios.

A hole was found in the top of the engine crankcase. The number two main bearing web had failed in fatigue, and the number two connecting rod had separated from the crankshaft and had punctured a hole in the crankcase. The cause of the fatigue failure of the bearing web could not be determined. Failure of the bearing web resulted in the loss of lubricating oil to the number two connecting rod bearing and the separation of the rod from the crankshaft. The engine lost power and then

stopped as a result of the internal fatigue failure and the subsequent oil starvation.

Because no better area was available, the forced landing was made in a tree-covered area.

The following laboratory report was completed: LP 238/86 - Connecting Rod Failure.

***FINDINGS:***

**Cause Related:**
1. The number two main bearing crankcase web failed in fatigue, causing the number two connecting rod to fail due to oil starvation.

**Other:**
-Nil-

## STINSON 108-2 C-FEDJ
## FORTEAU, LABRADOR, NEWFOUNDLAND
## 02 AUGUST 1986

BRIEF NUMBER: 86-A60027 (Accident)
LOCAL TIME: 1645 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 200 | 125 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

About five minutes after take-off, the engine began to run rough. After the pilot applied carburettor heat, the engine ran smoothly. About 10 minutes later, the engine again started to run rough, and the pilot made an unscheduled landing to check the aircraft. During the landing roll, the aircraft swerved left, ran off the runway, and came to rest nose-down in a ditch. The wind was blowing at about five knots during the landing.

## CESSNA 150H CF-ZFU
## PICTOU ISLAND, NOVA SCOTIA
## 05 AUGUST 1986

BRIEF NUMBER: 86-A60029 (Accident)
LOCAL TIME: 1815 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 650 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was landing the aircraft on a road. During the landing flare, the aircraft drifted left, and the left wing tip struck bushes on the shoulder of the road. The aircraft then ground looped into some trees.

## PIPER PA-20 PACER N8986C
## WATSON LAKE AIRPORT, YUKON TERRITORY
## 06 AUGUST 1986

BRIEF NUMBER: 86-W60904 (Accident)
LOCAL TIME: 1355 PDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,600 | 200 |
| LAST 90 DAYS | 200 | 200 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot carried out a normal approach, and the aircraft bounced on the main gear on touchdown. As the aircraft settled on the main gear, the left wing dropped, and the aircraft yawed left. The pilot attempted to correct the swing with right rudder and brake, and the aircraft ground looped right. The left gear folded inwards, and the left wing struck the runway.

The repair company indicated that the gear legs showed signs of poor maintenance.

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## PIPER PA-25-235 PAWNEE C-GSXC ARROWWOOD, ALBERTA 7 mi SE 06 AUGUST 1986

REPORT NUMBER: 86-W60042 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0830 MDT
OPERATION: Private Aerial Spray
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 485 |
| LAST 90 DAYS | 120 | 115 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was spraying the aphid control chemical 'lagon' on the trees of a farm site. As he completed his third swath, he pulled the aircraft into a steep, left climbing turn. The pilot felt the aircraft buffet and heard the stall horn just before the left wing dropped. The aircraft descended rapidly, struck the ground in a steeply banked, nose-high attitude, cartwheeled and came to rest in an upright position.

The aircraft was operating within the prescribed centre of gravity and weight limits. There was no indication of any pre-impact mechanical discrepancies in the flight controls or engine, and there was no evidence that the pilot was affected by the agricultural chemicals he was applying.

The aircraft was indicating 90 to 95 miles per hour prior to pulling up in the steep climbing turn. The estimated angle of bank during this manoeuvre was 60 degrees. The Pawnee aircraft stalls at 62 miles per hour (flaps up) in level flight. In a 60-degree banked turn and subject to the G load factor, an increase in stall speed of 40 per cent can be experienced. This equates to a stall speed of approximately 87 miles per hour in a coordinated level turn.

During the steep climbing turn, the airspeed decreased, causing the aircraft to stall when it reached the critical speed and load factor. Once stalled, there was insufficient altitude remaining for the pilot to effect recovery before the aircraft struck the ground.

***FINDINGS:***

**Cause Related:**
1. The aircraft stalled when insufficient airspeed was maintained during a low altitude steep climbing turn.

**Other:**
-Nil-

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## PIPER PA-12 SUPER CRUISER C-FCDE EDEN RANCH, BRITISH COLUMBIA 08 AUGUST 1986

BRIEF NUMBER: 86-P60032 (Accident)
LOCAL TIME: 1745 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 12,000 | 7 |
| LAST 90 DAYS | 145 | 7 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot intended to land the aircraft at his friend's private airstrip. As he had not landed there before, the pilot made a precautionary low pass along the airstrip to inspect the surface condition. He then found that his aircraft was unable to clear the rising terrain ahead, and he was forced to land in the trees off the end of the airstrip.

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## BELLANCA 7GCBC C-GGYQ
## ASTORVILLE, ONTARIO
## 08 AUGUST 1986

REPORT NUMBER: 86-O/60064 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1245 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,200 | 125 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft, with the pilot and one passenger on board, had taken off and was at a height of approximately 250 feet when the engine began to lose power. The pilot applied carburettor heat, but, the engine continued to lose power. The aircraft was still in a nose-high attitude, when one wing dropped violently. The pilot pushed the nose of the aircraft down, recovered control, and then force-landed the aircraft in a gravel pit. The aircraft came to rest in an inverted position against the embankment of the pit.

The air intake boot, which is attached by clamps to the bottom cowling and the carburettor heat box, had separated from the lower cowling and had been ingested into the carburettor heat box far enough to block the air valve in the cold position. As a result, when the pilot applied carburettor heat, the valve could not move to the hot position, thus preventing the engine from being supplied with an alternate source of air.

The intake boot is made of heavy rubber and, when installed on the cowling air intake and the carburettor heat box, is slightly compressed longitudinally, giving it a tendency to remain in position. It was concluded, therefore, that the last time the cowling had been reinstalled, the forward end of the intake boot had not been properly positioned over the lip of the lower cowling intake and, as a result, was ingested into the carburettor heat box.

***FINDINGS:***

**Cause Related:**
1. The air intake boot was not properly installed when the lower cowling was installed.

2. The forward end of the intake boot was ingested into the carburettor heat box, thus restricting the air flow to the engine.

3. The engine lost power because of the restricted air flow.

4. The ingested intake boot prevented the carburettor heat air valve from moving to the hot position which would have supplied an alternate air source for the engine.

5. The aircraft was force-landed in a gravel pit.

**Other:**
-Nil-



## CESSNA 172M C-GKJJ
## SAULT STE MARIE, ONTARIO
## 09 AUGUST 1986

BRIEF NUMBER: 86-O/60065 (Accident)
LOCAL TIME: 1008 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 340 | 240 |
| LAST 90 DAYS | 24 | 24 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

***REPORTED CIRCUMSTANCES:***

While the pilot was turning right to park the aircraft on the apron, the left outer wing struck a large light standard located on the apron edge.

The standard was one of a series installed at the edge of the concrete surface to illuminate the apron. The poles were marked with five bands of reflective tape. The position of these poles did not conform to the standards in AK-64-11-500 Apron Floodlighting. The pilot's attention had been distracted momentarily by guns fired to disperse seagulls from the airport area.

## CESSNA 152 N48734
## BATLEY ISLAND, BRITISH COLUMBIA
## 09 AUGUST 1986

**BRIEF NUMBER: 86-P60907 (Accident)**
**LOCAL TIME: 0130 PDT**
**OPERATION: Private Recreational**
**DAMAGE: Unknown**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 85 | 85 |
| LAST 90 DAYS | 13 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was on a night visual flight rules flight from Roche Harbour, Washington (San Juan Island) to Seattle, Washington when he became lost. After approximately two hours of flight, the engine stopped because of fuel exhaustion, and the pilot had to ditch the aircraft. Both the pilot and passenger escaped uninjured, and the aircraft sank.

Batley Island is on the west coast of Vancouver Island, about 90 nautical miles west of San Juan Island; Seattle is about 80 nautical miles southeast. The aircraft's only navigation aid, a very high frequency omnidirectional range (VOR) receiver, was not operating properly, and the pilot experienced some difficulty setting his directional gyroscope. The pilot attempted to contact Roche Harbour and Seattle via two-way radio but was unsuccessful because he was out of range. He did not attempt to use the emergency frequency 121.5 megahertz. The weather was not considered a factor in this accident.

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## BEECH 95-B55 BARON C-GDUX
## TORONTO ISLAND AIRPORT, ONTARIO
## 09 AUGUST 1986

**REPORT NUMBER: 86-O/60066 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 1740 EDT**
**OPERATION: Private Recreational**
**DAMAGE: Substantial**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 30 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot, who was on a pleasure flight from Oshawa, Ontario, landed on runway 26 at Toronto Island Airport. The aircraft had rolled 800 feet on all three gear when the nose gear collapsed rearward. The aircraft then skidded along the runway on its nose. Near the end of the skid, the right main gear collapsed.

The pilot selected gear down while on final approach, and the three green down-and-locked lights illuminated. He stated that he did not hear the gear warning horn, even after the nose gear had collapsed. The tower controller had visually confirmed that all three gear were down before the aircraft landed.

Examination of the aircraft revealed that the main gear downlocks were not engaged and that the downlock cables were slack. The main gear inboard doors were open, and the gear selector handle was in the down position.

After the aircraft was jacked up on the runway, the landing gear emergency hand crank was rotated in the extend direction; all three gear extended, and the main gear downlocks engaged. The nose gear overcenter downlock would not go overcenter and lock because the retract rod had bent when the nose gear collapsed.

There were no malfunctions in the landing gear system, and the gear position lights and the warning horn functioned normally. Normally, following an up selection of the landing gear, the inboard gear doors open and the downlocks disengage. The landing gear system was deemed to be in transit because the inboard gear doors were fully open, the main gear downlocks were disengaged, and the cables were slack. The nose gear overcenter downlock was disengaged while in transit, which

allowed the nose gear to collapse after the aircraft had rolled 800 feet on the landing gear. The reason the gear was in transit was not determined.

***FINDINGS:***

**Cause Related:**
1. During the landing roll, the landing gear system was in transit, and, as a result, the nose and main gear collapsed.

**Other:**
-Nil-

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## PIPER PA-28-235 CHEROKEE C-FQGF
## COLBOURNE, ONTARIO 2 mi W
## 14 AUGUST 1986

**REPORT NUMBER: 86-O60069 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 1400 EDT**
**OPERATION: Private Recreational**
**DAMAGE: Substantial**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 100 | 50 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

***SUMMARY REPORT:***

The pilot was attempting a full-stop landing in a northerly direction on the 2,200-foot turf private airstrip which was oriented north/south. The airstrip was obstructed by two sets of power lines, one set crossed the runway 400 feet in from the south end of the runway, and the other set was located at the north end of the runway; both sets of wires crossed the runway at right angles.

After approaching over the wires at the south end, the pilot landed the aircraft on the airstrip. The aircraft had rolled a short distance, when the pilot decided to go around. Full power was applied, but the aircraft did not become airborne prior to running off the end of the runway. It then struck a ditch before becoming airborne, flew over a highway, and came to rest in a farm field. Full flap had been extended for the landing and had not been retracted for the go-around. Pilots who were familiar with this airstrip normally landed under the wires that crossed the runway.

The wind reported at a nearby weather station was from 162 degrees magnetic at six knots.

Because of the obstructions on the approach and the tail wind, the aircraft was landed long. The pilot attempted the go-around with insufficient runway remaining, and the aircraft overran the end of the runway.

***FINDINGS:***

**Cause Related:**
1. The pilot landed long because of a tail wind and obstructions on the approach.

2. The aircraft overran the runway during the attempted overshoot because there was insufficient runway remaining.

**Other:**
-Nil-

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## CESSNA 172F N5609R
## BANFF, ALBERTA 10 mi SW
## 14 AUGUST 1986

**REPORT NUMBER 86-W60906 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 1535 MDT**
**OPERATION: Private Recreational**
**DAMAGE: Substantial**
**PILOT LICENCE: Private (U.S.A.)**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 120 | 120 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | 1 | 1 |

***HISTORY OF THE FLIGHT:***

A pilot, accompanied by his wife and two young daughters, departed from the Banff Airstrip at 1500 mountain daylight time (MDT) on a day visual flight to Kalispell, Montana. The flight-planned route was along the Trans-Canada Highway in a northwesterly direction then west through the Vermilion Pass. The aircraft was observed flying from the road leading west to the Sunshine Village ski resort, at low level, 12 miles short of

the correct turn-off. The aircraft was flying up a narrow, steeply sloping valley when it struck 50-foot trees, then descended steeply into a rocky creek bed, and came to rest in an inverted position. The pilot and the front-seat passenger were fatally injured, and one of the two back-seat passengers received serious injuries.

***PERTINENT INFORMATION:***

The aircraft, which was at maximum gross weight, took off from the Banff Airstrip (elevation 4,583 feet) in mid-afternoon temperatures of 23 degrees Celsius. The aircraft was observed at low altitude and low ground speed in gusty head winds. Surface winds in the area were recorded gusting to 24 knots. The narrow valley that the pilot had entered sloped upward at an average angle of 20 degrees.

The pilot and his wife, who was sitting in the front right seat, were not using the shoulder harnesses installed in the aircraft. When the aircraft struck the rocky creek bed at a steep angle, the engine was displaced rearward into the passenger cabin. This resulted in the instrument panel and control wheels moving rearward into the pilot and his wife, causing fatal injuries. An 11-year-old daughter, sitting in the rear seat was seriously injured and was evacuated from the wreckage by her uninjured six-year-old sister. The uninjured six-year-old girl proceeded downhill toward the ski lift until she encountered some hikers. The hikers summoned a park ranger who called in a rescue helicopter.

***ANALYSIS:***

While attempting to follow the highway through the Vermilion Pass, the pilot incorrectly turned into a valley leading to a ski resort. He was observed flying at low altitude and low ground speed against gusty winds. The narrow valley precluded turning around, and the steep slope exceeded the climbing capability of the aircraft. The aircraft's climb performance was degraded by operation at maximum gross weight in 23 degree temperatures at high altitude. The calculated density altitude was 8,500 feet.

It is considered doubtful that use of shoulder harnesses would have reduced injuries to the occupants of the front seats. Because the antenna was shielded by the wreckage, the ELT was ineffective.

***FINDINGS***

**Cause Related:**
1. The pilot followed the wrong road and entered a narrow, steeply sloping valley.

2. The slope of the valley exceeded the climb capability of the aircraft.

3. The aircraft's climb performance was degraded by a combination of high altitude, weight, and temperature.

**Other:**
1. The installed shoulder harnesses were not used.

2. The ELT was ineffective because the antenna was shielded by the wreckage.

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## CESSNA 172N C-GYTN
## OXFORD MILLS, ONTARIO
## 17 AUGUST 1986

REPORT NUMBER: 86-O/60071 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1730 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 263 | 190 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was attempting a full-stop landing at his private aerodrome. He flew two approaches with full flap extended to land towards the west on the east/west oriented 1,800-foot runway. The pilot did not land off the first approach as the aircraft was too high and he landed long off the second approach. The pilot elected to go around from the landing and applied full throttle after retracting the flaps. The aircraft became airborne near the end of the runway but collided with trees off the end of the runway, damaging the right horizontal stabilizer. After the airborne collision, the pilot climbed to about 300 feet, completed a 180-degree turn, and landed in an easterly direction on the runway.

The surface winds were reported to be light and variable with the outside air temperature +28 degrees Celsius at the time of the accident. The aircraft's take-off and climb performance was degraded because of the high air temperature. This, combined with the pilot's decision to go around after touching down long on the runway,

resulted in insufficient runway remaining for the aircraft to take-off and clear obstacles at the end.

***FINDINGS:***

**Cause Related:**
1. The pilot was attempting a go-around after landing long on the runway.

2. The aircraft collided with trees during climb-out when the pilot delayed his decision to go around from the approach.

**Other:**
-Nil-

✈ ✈ ✈ ✈ ✈

PIPER J-3 CUB C-FSCT
COBOCONK, ONTARIO 3 mi W
17 AUGUST 1986

REPORT NUMBER: 86-O/60070 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1730 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,265 | 1,000 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The aircraft took off into wind from runway 31. During the climb-out, at a height of about 100 feet above ground level, the engine began to sputter and lose power. The aircraft was within the aerodrome boundary, and the pilot turned steeply left in an attempt to land on runway 22 which intersects the end of runway 31 at right angles. The aircraft overflew to the left of runway 22, and, as the pilot corrected with right aileron, the left wing tip struck two trees adjacent to runway 22. The aircraft then yawed left about 100 degrees and struck the ground in a nose-down, right-wing-low attitude.

Contaminated fuel was found in the main feed line from the gascolator bowl to the carburettor. The fuel sample taken contained white sediment, and the fuel had a murky appearance. The sediment could have been a microbiological growth that resulted when natural heat raised the temperature of the fuel and water mixture in the aircraft's fuel tanks over an unknown period of time. Because of the small size of the sediment, it was not trapped by the gascolator's internal flat screen. The introduction of the contaminated fuel into the engine reduced the quality of combustion, and, hence, an interruption of power occurred. The engine subsequently ran satisfactorily on uncontaminated fuel.

During the steep left-hand turn, the pilot did not compensate for the cross-wind condition. The aircraft flew too far to the left of the runway, and the left wing struck the trees on the side of the runway.

***FINDINGS:***

**Cause Related:**
1. The engine lost power because contaminated fuel was introduced into the engine fuel feed line.

2. During the forced landing, the pilot did not adequately compensate for the cross-wind and allowed the aircraft to contact the trees.

**Other:**
-Nil-

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CESSNA 177A C-GBIS
ALEXANDRIA AIRPORT, ONTARIO
17 AUGUST 1986

REPORT NUMBER: 86-O/60073 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1300 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 368 | 138 |
| LAST 90 DAYS | 30 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 2 | 1 |

***SUMMARY REPORT:***

The aircraft was on a day visual flight rules (VFR) private recreational flight from the Montreal, Quebec area to Alexandria, Ontario and return. The aircraft was observed to commence the take-off run for the return

trip to Montreal from the vicinity of the runway end markers for runway 25. After travelling approximately one-third the distance of the runway, the aircraft was placed in a nose-up attitude and continued in this attitude, accelerating slowly before becoming airborne near the end of the runway. After becoming airborne, it began to bank and drift to the left, and the left landing gear struck a runway end marker off the left side of the runway. Shortly thereafter, the left wing, left landing gear, and the right side of the stabilator struck fence posts. The aircraft settled back onto the ground, coming to rest partially on its right side on the bank of a large drainage ditch, approximately 60 feet west of the end of the runway and 75 feet south of the extended centre line of the runway.

Runway 25, which is 2,120 feet long by 100 feet wide with a turf surface, was used for the take-off. The threshold of runway 25 is displaced 280 feet, and the threshold of runway 07 is displaced 100 feet for landing aircraft. Both runway thresholds are marked with runway end markers located at the displaced threshold locations. The displaced areas of both runways are suitable for take-off and overrun purposes. The runway was firm and in a well-maintained state at the time of the accident.

Weather conditions were hot and hazy with light winds. The 1300 EDT weather observation taken at the Ottawa International Airport was scattered cloud at 1,600 feet, with the visibility six miles in haze. The temperature and dew point were +26 degrees Celsius and +21 degrees Celsius respectively with the wind from 140 degrees at four knots. Relative humidity was 70 per cent.

Post-crash examination of the engine, cockpit controls, and indicators revealed that the carburettor heat valve and cockpit control were in the hot position, the stabilator trim indicator was in the near full nose-up position, and the wing flaps indicator was indicating 10 degrees of flap extended.

The aircraft weight and centre of gravity were within the prescribed limits, and, under the existing conditions at the time of the occurrence, the aircraft would have required a runway length of approximately 1,440 feet for take-off to clear 50-foot obstacles.

The aircraft was equipped with shoulder harnesses in the front seats. No injuries to the face and upper torso were sustained by the pilot and front-seat passenger.

Sufficient runway was available for the operation of the aircraft; however, because of the high air temperature and light wind conditions, adequate acceleration along the ground prior to rotation for take-off and accurate control of airspeed after lift-off would have been required for the take-off to be successful.

The aircraft was rotated for take-off shortly after the take-off run began and was held in a nose-high attitude, which resulted in slow acceleration of the aircraft during the take-off run. The high air temperature, high relative humidity, and carburettor heat in the hot position degraded the engine performance and resulted in slow acceleration throughout the take-off run.

The aircraft drifted to the left after becoming airborne, a factor which is indicative of a nose-high attitude, high power, and low airspeed. A stabilator trim set nose-up would contribute to the aircraft nose pitching up as the airspeed increased. It is possible that either the stabilator trim was not correctly set prior to take-off, or the pilot moved the trim to a nose-up position after the aircraft became airborne. An out-of-trim condition would make the task of accurately controlling the airspeed difficult for the pilot during the initial climb.

The wearing of the available shoulder harnesses by the pilot and front-seat passenger prevented injuries to their face and upper torso.

*FINDINGS:*

**Cause Related:**

1. The aircraft nosewheel was rotated off the ground before the aircraft had accelerated sufficiently to take off.

2. The aircraft was held in a nose-up attitude throughout the take-off roll and did not become airborne until near the end of the runway.

3. Initial climb was attempted at low airspeed in a nose-high attitude.

4. The aircraft drifted to the left and collided with obstructions off the side and end of the runway.

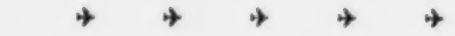
**Other:**

1. The engine carburettor heat was in the hot position for take-off.

2. The stabilator trim was found in the nose-up position, well beyond the take-off range setting.

3. The pilot did not use all the runway available for the take-off run.

4. The wearing of the available shoulder harnesses by the pilot and front-seat passenger prevented injuries to their face and torso.



## CESSNA 337G SKYMASTER C-GFTZ
## OSHAWA AIRPORT, ONTARIO 1 mi NW
## 18 AUGUST 1986

REPORT NUMBER: 86-O/60074 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1913 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 500 | 300 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The aircraft took off on a visual flight rules (VFR) flight from Oshawa Airport to its home base in Buttonville, Ontario. During the climb-out, at a height of 400 to 500 feet above ground level, the pilot selected the landing gear up. Immediately following the selection, the pilot heard an abnormal amount of noise which he diagnosed as a malfunction in the landing gear system. The noise was followed by a noticeable decrease in the climb rate. The pilot selected the landing gear down and reduced the flap setting from two-thirds to one-third in order to reduce the drag. He contacted Oshawa tower and stated he would be returning to Oshawa Airport for a landing.

During the left-hand turn back to the airport, the pilot realized he could not reach the runway and concentrated on selecting a suitable field for a forced landing, rather than attempt to determine the cause of the loss of performance.

The aircraft settled into a cornfield in a slight left-wing-low attitude and came to rest in an upright position.

A substantial amount of water was found in the right wing tank and throughout the components of the rear engine's fuel injection system. The right wing tank was supplying fuel to the rear engine. When examined after the accident, this engine was noticeably cooler than the forward engine.

Prior to the flight, the aircraft was fuelled to capacity at the Oshawa Airport. The pilot sampled the fuel from the aircraft tanks prior to the refuelling and found no presence of water.

The refuelling tank on the fuel distributor's truck was checked for water contamination, but no evidence of water was found.

The rubber seal on the right wing fuel tank cap was found severely distorted and did not properly seal the wing tank to prevent entry of rain. The fuel cap also incorporates a one-way relief valve. When a negative pressure exists inside the tank, the relief valve opens and allows venting of the tank to prevent the tank from collapsing. During the period the aircraft was parked at the airport, several severe rainstorms occurred in the area. The combination of the distorted rubber seal and the one-way relief valve in the cap allowed the water to enter the tank through and around the cap and accumulate in the tank. In checking for water, the pilot used a one-ounce transparent drain cup to obtain a sample from the right wing tank. It is probable that the sample taken was all water, and the pilot assumed the sample to be clear fuel and did not drain any further.

During the take-off, the engine was operating on the fuel that remained in the fuel supply lines located between the right wing tank and the rear engine compartment. As this fuel was consumed, the water began to flow from the wing tank through the supply lines and to the engine, resulting in the engine power loss.

The pilot did not recognize that the decrease in climb performance was due to the power loss on the rear engine and, as a result, did not implement the manufacturer's emergency procedures for an engine power loss and feather the propeller. Included in the procedures is the statement that "a windmilling propeller causes a severe drag penalty and, therefore, climb or continued level flight may not be possible, depending on weight, altitude, and temperature."

*FINDINGS:*

**Cause Related:**
1. A distorted fuel cap seal allowed water to enter the right wing tank during periods of heavy rainfall, which resulted in contamination of the fuel and the eventual engine power loss.

2. The fuel samples taken from the right wing tank by the pilot did not reveal the presence of water in the tank.

3. The pilot did not recognize the failure of the rear engine and, therefore, did not feather the propeller to reduce the drag and maintain flight.

**Other:**
-Nil-

## PIEL EMERAUDE CP301 (Amateur-built) CF-BYR
## WINNIPEG/LYNCREST AIRPORT, MANITOBA
## 19 AUGUST 1986

BRIEF NUMBER: 86-C60084 (Accident)
LOCAL TIME: 2000 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 200 | 65 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *REPORTED CIRCUMSTANCES:*

The pilot returned to his home airport after a short local flight. After touchdown, the aircraft travelled a few feet, nosed over, and came to rest in an inverted position. The pilot discovered that he had landed in a wheat field beside the runway.

Heavy black clouds to the west resulted in poor light conditions in the area of the airport. The runway was marked by orange markers; however, they were obscured by tall grass. The markers were not visible to the pilot under the conditions that existed.

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## CESSNA 182G CF-MCO
## MARILLA AIRSTRIP, BRITISH COLUMBIA
## 22 AUGUST 1986

REPORT NUMBER: 86-P60048 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1610 PDT
OPERATION: Private Company Business
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,000 | 1,000 |
| LAST 90 DAYS | 1 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 2 | - | - |

### *HISTORY OF THE FLIGHT:*

The aircraft departed from Prince George, British Columbia, for a one-hour visual flight rules (VFR) flight to Marilla Airstrip, British Columbia with the pilot, two passengers, and freight on board. On arrival, the pilot flew over the strip and then commenced an approach from the west, over Ootsa Lake. The aircraft had not touched down by the mid-point of the strip, and an overshoot was performed followed by another circuit. On the second approach, the aircraft once again passed the mid-point of the airstrip without touching down, and the pilot carried out an overshoot. On the second overshoot, the aircraft climbed slowly and then commenced a left turn. During the turn, it struck trees located on high ground just beyond the strip. The pilot and passengers were fatally injured.

### *PERTINENT INFORMATION:*

The Marilla Airstrip is a grass strip, 1,880 feet long and 85 feet wide, located on the shore of Ootsa Lake. It is oriented 050/230 and is 3,000 feet above sea level (asl). The approach for runway 05 is over the lake. This runway has an average 1.5 per cent upslope, and the far end is marked by a fence and a road. The overshoot area beyond the fence is rough pasture for the first 1,100 feet; this area slopes up gently. Beyond this point are trees, and the gradient increases toward a ridge of hills which are 3,800 feet asl and less than a mile from the end of the strip. A windsock is located at the end of the strip furthest from the lake.

The aircraft struck the trees 2,100 feet beyond the runway end, 380 feet left of the extended centre line and approximately 190 feet above the runway end elevation. Initial contact occurred in a nose-high attitude at low airspeed. The left wing detached on contact with the trees, and the aircraft rolled, striking the ground in a nearly inverted attitude.

Examination revealed that the engine was developing power at impact. The flaps were at the 40-degree, full-down position; the flap indicator showed 20 degrees. The flap motor, switch, and gauge were removed for functional testing. The motor and switch functioned normally, but the gauge remained in the 20-degree position. The flap switch was spring-loaded and had to be held for the flaps to move. When the switch was released, the flaps stopped and remained in that position. The owner reported that the gauge had been unserviceable for some time and that the pilot was aware of the problem.

Weather conditions at the time of the accident were clear skies and a temperature of 22 degrees Celsius. Actual winds at the strip were not recorded. Eyewitness

reports vary from calm conditions to winds off the lake at approximately 10 knots.

The aircraft was carrying three people and approximately 135 pounds of freight. At Prince George, the aircraft was fuelled to full tanks, that is, 85 U.S. gallons. The gross weight at the time of the accident was calculated to be 2,798 pounds. The aircraft's certified maximum weight was 2,800 pounds.

The aircraft logbooks indicated that the engine had exceeded the 1,500-hour overhaul requirement by approximately 20 hours, and the propeller had been due for overhaul in January 1986. The unserviceability of the flap gauge was not recorded in the logbooks.

The aircraft was equipped with a Horton Short Take-off and Landing (STOL) kit. This kit is designed to lower the aircraft's stalling speed, thereby shortening the take-off and landing distances. When this modification is completed, no amendment is required to be made to the performance or handling sections of the aircraft's handbook. However, Horton, the manufacturer of the kit, does send a letter to the aircraft owner. This letter states that the aircraft may be operated in accordance with the handbook provided by Cessna aircraft. It also states that "to obtain maximum performance from an aircraft equipped with a Horton STOL CRAFT conversion, it is suggested that each pilot familiarize himself or herself with the aircraft at a safe altitude to assure them of the stability at slower airspeeds than called out in the standard Cessna handbook."

The pilot was familiar with the aircraft in the original configuration, having sold it to the present owner in January 1985. The new owner had installed the Horton STOL kit in March 1986, and the pilot and new owner flew together on a check-flight to assess the stall characteristics of the aircraft. During this flight, the pilot was at the controls for a series of stalls, but the new owner performed the landing. The new owner reported that, with the installation of the STOL kit, the power-off stall speed with flaps at the 40-degree position was 38 mph. He also reported that the aircraft had a tendency to float during the landing flare, unless the approach speed was reduced by about 10 knots. On 23 July 1986, the pilot flew from Prince George to Smithers and back. This flight and the test flight were the only two flights the pilot had flown since July 1985. Both airports have paved runways in excess of 4,400 feet and have level approaches and overshoot areas.

The pilot carried a "universal" check-list. This outlined normal and emergency procedures for the aircraft. The speed for a short-field landing was shown as 60 knots (69 mph). The procedure for an overshoot called for retracting the flaps to 20 degrees, then allowing the airspeed to build up to a speed greater then 70 knots (80 mph) prior to flap retraction. The maximum rate of climb is achieved at 75 knots (50 mph) with flaps at 20 degrees. These check-list speeds conform to the recommended Cessna figures, and no adjustments were made to reflect the reduced stall speeds with the installation of the STOL kit.

The Cessna aircraft company advised that baulked landing test flights on an unmodified Cessna 182 indicate that an aircraft at a gross weight of 2,800 pounds, at 3,000 feet asl on a standard day, with the flaps set at 40 degrees is capable of climbing at 396 feet per minute.

The pilot's licence validation certificate had expired in July 1984. The autopsy did not reveal any medical factors that could have contributed to the accident.

*ANALYSIS:*

When the aircraft struck the trees, the engine was developing power and the propeller was functioning normally. With the exception of the flap gauge, there were no known aircraft unserviceabilities at the time of the accident.

The location of the accident indicates that the aircraft met the manufacturer's performance figures for a baulked landing climb even though the temperature was above standard.

The pilot had not flown the aircraft for some time and had not performed any landings on short airstrips since the STOL kit had been installed. If the approach was flown at the recommended approach speed, the aircraft would have tended to float on the round-out. This float would have been aggravated by the presence of a tail wind. When touchdown had not occurred by the mid-point of the strip, an overshoot was completed. It is not known what flap setting was used on the first overshoot. On the second approach, the pilot may have reduced the approach speed a little and continued the landing effort to a point further down the runway. This would have resulted in the overshoot being commenced at a lower airspeed, closer to the high ground. On the overshoot, the pilot either forgot to raise the flaps or forgot about the unserviceability of the flap gauge and believed them to be in the 20-degree position as called for in the overshoot procedures. The pilot, who would have been fully occupied flying the aircraft and applying power, may have forgotten to raise the flaps. The spring-loaded flap selector would have added to the pilot's workload at a critical time in the overshoot. Because the flaps were left at the 40-degree position, the aircraft, operating at close to its maximum gross weight, was unable to climb above the trees.

The gentle upslope of the initial overshoot area may not have been detected by the pilot and may have led him to continue the climb straight ahead in the belief that the aircraft was gaining altitude. By the time the pilot realized that he was not climbing at a high enough rate, any attempt to turn away from the high ground would have reduced the aircraft's rate of climb and aggravated the situation.

*FINDINGS:*

**Cause Related:**
1. The pilot was unfamiliar with the handling characteristics of the modified aircraft and was committed to an overshoot when touchdown had not occurred by the mid-point of the short airstrip.

2. During the overshoot, the pilot left the flaps in the 40-degree position.

3. The flap selector was spring-loaded and had to be held up or down in order for the flaps to move.

4. The flap gauge was unserviceable and indicated 20 degrees regardless of the flap position.

5. Because of the drag caused by the flaps being fully down, the aircraft, operating at close to its maximum weight, was unable to clear the rising terrain.

**Other:**
1. The aircraft's engine and propeller had exceeded the required overhaul times.

2. The pilot's licence validation certificate had expired.

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## PIPER PA-22-150 COLT C-FKRC
## MILL RIVER, PRINCE EDWARD ISLAND
## 22 AUGUST 1986

REPORT NUMBER: 86-A60031 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1040 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 93 | 11 |
| LAST 90 DAYS | 63 | 11 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*SUMMARY REPORT:*

While taking off from a 2,300-foot private grass airstrip in his recently purchased aircraft, the pilot became concerned that he was not going to clear the trees at the departure end. He lifted the aircraft off early and attempted to climb at a steeper than normal attitude. At a height of 10 to 15 feet, the aircraft stalled and crashed at the edge of the airstrip, 1,770 feet from the threshold.

During the climb-out, the pilot did not monitor the airspeed, and, as he pulled back on the control column in an effort to gain altitude quickly, he induced a stall. The pilot had flown only 11 hours from this grass airstrip and had not received any dual instruction on grass strip operations. There were no reported or discovered aircraft malfunctions, and wind and weather were not factors in this accident.

*FINDINGS:*

**Cause Related:**
1. In an attempt to climb too quickly, the pilot induced a stall.

2. The pilot had not received dual instruction on grass strip operations.

**Other:**
- Nil -

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## CESSNA 172 SKYHAWK C-FLJH
## FAIRLIGHT, SASKATCHEWAN 8 mi S
## 23 AUGUST 1986

REPORT NUMBER: 86-C60087 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1215 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 177 | 155 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

During a recreational flight, the pilot noticed that the oil pressure gauge needle was fluctuating and decided to carry out a precautionary landing on a road. After touchdown, the aircraft drifted towards a ditch. The pilot applied power to overshoot; however, the horizontal stabilizer struck a fence post, a strand of wire fouled the elevator, and the aircraft swung off the road and into a field.

The engine and oil pressure gauge were examined, and no fault could be found. There was sufficient oil in the system, and it was free of contaminants. The cause of the fluctuation was not determined.

A narrow, gravel road was selected for the precautionary landing. Following touchdown, a 90 degree cross-wind at 15 gusting to 20 knots caused the aircraft to drift toward a ditch which paralleled the road. When the left horizontal stabilizer struck the fence post and snagged the wire during the attempted overshoot, the aircraft could not be controlled.

***FINDINGS:***

**Cause Related:**
1. A precautionary landing was carried out because the oil pressure gauge needle was fluctuating.

2. While landing on the narrow road in a strong, gusty cross-wind, the pilot lost directional control of the aircraft.

**Other:**
-Nil-

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## CESSNA 172H CF-TKU
## SEVEN PERSONS, ALBERTA 1 mi NW
## 24 AUGUST 1986

REPORT NUMBER: 86-W60050 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1530 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 80 | 80 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | 2 |

***SUMMARY REPORT:***

The pilot and three passengers were on a local recreational flight, during which the right front seat passenger took pictures of their farm. Several passes were made past the farm at altitudes of 200 to 300 feet, and, during the last flight past the farmhouse, the aircraft descended from 200 feet to about 30 feet. The pilot suddenly noticed a power line in front of the aircraft, and he reacted by pulling back hard on the control column. The aircraft stalled and rolled sharply onto its back, scraping the left wing tip on the ground during the roll. The aircraft then nosed down vertically into the ground. The pilot and right front seat passenger were seriously injured.

The pilot had been flying visually without reference to the engine and flight instruments. During the time the photographs of the farm were being taken, the wind, which had been only 5 knots, suddenly increased to 20 with gusts to 30 knots, as recorded at a nearby airport. On the last photo run, the pilot's attention was focused on the farm buildings to the right and to the rear of the aircraft, and the aircraft was observed to be at slow speed as it descended toward the ground.

The pilot's concentration on his attempt to place the aircraft in the most favourable position to photograph the farm was such that he did not notice that the aircraft was losing altitude. The descent of the aircraft and the decrease in airspeed to near the stall during the last pass indicated that power had been reduced following the first two runs. This would have occurred during the downwind leg prior to the final run when the 20- to 30-knot increase in wind speed would have given an illusion of an increase in airspeed. On the last photo run into wind, the decrease in altitude and airspeed resulting from the decrease in power, went unnoticed. The rapid

movement of the control column to avoid the power line caused the aircraft to stall.

***FINDINGS:***

**Cause Related:**
1. The pilot did not monitor the engine and flight instruments, and, as a result, the aircraft descended to within 30 feet of the ground.

2. The rapid application of power and up elevator, at a speed just above the stall, caused the aircraft to roll sharply and nose down into the ground.

**Other:**
-Nil-

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## MOONEY M20E C-GJCQ
## WINNIPEG, ST. ANDREWS AIRPORT, MANITOBA
## 30 AUGUST 1986

REPORT NUMBER: 86-C60091 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0955 CDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 180 | 6 |
| LAST 90 DAYS | 5 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The pilot had recently purchased the aircraft and was undergoing a flight check-out. During the take-off roll, the landing gear collapsed, and the aircraft came to rest on the runway.

The pre-flight and take-off checks were completed in accordance with established procedures. The landing gear down-and-locked light was illuminated, and the gear lever appeared to be locked in position.

The landing gear is manually operated by means of a selection lever. The gear is extended by raising the lever and latching the handle into a gear selector lock attached to the instrument panel. This action also activates a microswitch which illuminates the landing gear down light.

Inspection of the aircraft after the accident revealed that the landing gear lever had worn a notch in the selector lock (Mooney part number 560050). Testing showed that it was possible for the lever to enter the lock and hang on the notch. This gives the appearance that the lever is fully locked when it is not. Also, the position is such that the microswitch can be activated, thus illuminating the landing gear down-and-locked light. During selection tests, this situation occurred one out of five times, and an extra push was required to ensure that the lever was fully latched in the locking socket. The notch in the selector lock was caused by normal wear during use of the selection lever.

Prior to take-off, all cockpit indications were that the landing gear was down and locked. However, the gear lever was hung on the notch, and vibration during the take-off roll jarred the lever loose, allowing the landing gear to collapse.

***FINDINGS:***

**Cause Related:**
1. The landing gear selector lock was worn through normal use.

2. The landing gear collapsed because the landing gear selection lever was not properly locked.

**Other:**
-Nil-

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## GLOBE SWIFT C-FBPL
## CAMROSE, ALBERTA
## 31 AUGUST 1986

REPORT NUMBER: 86-W60053 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1120 MDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 850 | 170 |
| LAST 90 DAYS | 7 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

In preparation for a cross-country trip, the pilot was flying a circuit to check the aircraft loading, prior to boarding a passenger. After take-off, at about 100 feet above ground level, the aircraft began to descend. The aircraft maintained a nose-high attitude as it lost altitude, and it landed heavily about 2,000 feet past the end of the runway. An intense post-crash fire consumed the cabin and a substantial portion of the area forward of the firewall. The pilot was able to escape the burning wreckage, but he suffered leg burns and a compression fracture of the spine.

The aircraft was about 14 pounds below the gross take-off weight of 1,710 pounds, and the centre of gravity (C of G) limitations were not exceeded. However, the C of G was further aft than previously experienced by this pilot. The aircraft took off on runway 13 into a five-knot wind.

The pilot reported that the engine appeared to lose power in the climb. The engine was recovered and disassembled, but no mechanical fault was found. Damage from the fire was too extensive to allow examination of other power-related systems or components. Witnesses who observed and/or heard the aircraft take off stated that the sound of the engine was normal and did not change before the crash. One witness also stated that the aircraft had an unusually nose-high attitude and appeared to be operating at a low airspeed.

Initial ground contact was made by the tail wheel, followed by the main gear. The vertical force was sufficient to drive both main gear legs through the top of the wings. Propeller slash marks, 10 inches apart, were found in the ground at the beginning of the 62-foot-long wreckage trail. Screws that retain the blades to the propeller hub were bent substantially in the plane of rotation. With an assumed ground contact speed just below stall, the engine speed was calculated to be about 2550 rpm, which is rated take-off rpm.

Although the aircraft was within the acceptable range for weight and balance, the pilot was not experienced flying the aircraft at gross weight with an aft centre of gravity. The aircraft was flying at a low airspeed, and thrust from the engine could not overcome the high drag generated by the nose-high attitude. This condition is generally referred to as "behind the power curve." Evidence at the crash site and subsequent tests indicate that the engine was producing full-rated power at the time of the accident. The pilot perceived the aircraft's decaying performance as a loss of engine power and did not recognize the high-drag attitude of the aircraft.

***FINDINGS:***

**Cause Related:**
1. The pilot allowed the aircraft to get behind the power curve after take-off, and it descended to the ground.

**Other**
-Nil-

## CESSNA 172F C-FRNW
## CHARLOTTETOWN, PRINCE EDWARD ISLAND
## 31 AUGUST 1986

**BRIEF NUMBER:** 86-A60032 (Accident)
**LOCAL TIME:** 1744 ADT
**OPERATION:** Private Recreational
**DAMAGE:** Substantial
**PILOT LICENCE:** Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 357 | 57 |
| LAST 90 DAYS | 31 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

While in cruise flight, continuous right rudder was required to maintain straight flight. During the landing roll, the aircraft veered left, and the pilot was unable to regain directional control. The aircraft tipped, causing the propeller and right wing tip to contact the runway, and the aircraft stopped on the runway edge.

After the flight, it was discovered that the bolt that connects the upper and lower torque links in the nosewheel assembly was missing. The nosewheel was turned off-centre which caused yaw during flight and the loss of nosewheel steering on landing. The pilot stated that the bolt, along with the nut and cotter pin, were present during the pre-flight inspection.

**CESSNA 210B CENTURION C-GKNW**
**JASPER, ALBERTA 15 mi W**
**01 SEPTEMBER 1986**

**REPORT NUMBER: 86-W60052 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 0730 MDT**
**OPERATION: Private Recreational**
**DAMAGE: Destroyed**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 130 | 21 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The aircraft departed from Edmonton, Alberta, at 0530 mountain daylight time (MDT), on a visual flight rules (VFR) flight to Kelowna, British Columbia, via Jasper and Blue River. Approximately 1 hour and 45 minutes after take-off, the pilot reported flying at 7,000 feet above sea level (asl), one mile north of Jasper Airport. He radioed that the weather seemed to be deteriorating and that light rain was falling. When the aircraft failed to arrive at destination, a search was conducted. The burnt wreckage of the aircraft was located on its intended track, approximately 15 miles west of the town of Jasper, Alberta. The pilot had been killed on impact.

***PERTINENT INFORMATION:***

The aircraft struck the side of a hill at 3,870 feet asl, on a southeasterly heading, in a 45-degree nose-down, inverted attitude. It came to rest at the bottom of the hill, at 3,700 feet asl. There was no evidence of a pre-impact airframe or control failure. Both the flaps and gear were up at impact. Laboratory analysis of the propeller and the engine showed that the aircraft engine was producing power at impact. There was sufficient fuel on board to complete the trip.

There was no indication that the pilot obtained a weather briefing prior to departure. At Jasper, the pilot was given the local weather, which was 3,500 feet scattered, estimated ceiling 6,000 feet overcast, and visibility of 20 miles in light rain showers.

After Jasper, the aircraft's route was in a westerly direction, toward a mountainous area with peaks rising to above 7,000 feet asl. A weather assessment provided by Environment Canada indicated that, for the period of 0500 to 1100 MDT, a band of mid- and high-level moisture was present in the area. Light rain showers had developed over the mountains and foothills, and this area of precipitation did not move away until mid-day. Scattered clouds around 1,000 feet above ground level (agl) formed because of the early morning precipitation. The area forecast called for visibility to vary from one quarter of a mile to three miles in fog patches, until mid-morning. Witnesses, one of whom was a professional pilot, reported that, at approximately 0700 MDT, the weather in the area was not suitable for visual flight and light rain was falling; they estimated the ceiling at 500 feet agl. They also indicated that, at the time of the accident, the worst weather was in the vicinity of the crash site, that the visibility was limited, and that it was quite dark.

The aircraft was equipped with the required instrumentation and equipment for flight under instrument meteorological conditions (IMC). The pilot had received 3.1 hours of simulated instrument flying. His licence was not endorsed for instrument flight. The pilot was well rested before his flight on the previous day from Kelowna to Edmonton, from which he landed at 2030 MDT. He had had approximately 5 hours and 15 minutes of rest prior to commencing his return flight to Kelowna. There were no known psychological or physiological factors which may have affected the pilot's performance.

***ANALYSIS:***

The flight path of the aircraft into the trees and its inverted attitude indicate that the pilot lost control of the aircraft. The pilot encountered deteriorating weather conditions and lost visual reference with the ground. Because of his limited instrument flying experience, he became disoriented and lost control of the aircraft.

The following laboratory report was completed: LP 226/86 - Fuel Pump Examination.

***FINDINGS:***

**Cause Related:**
1. Because of his limited instrument experience, the pilot became disoriented and lost control of the aircraft when he encountered instrument meteorological conditions.

**Other:**
-Nil-

## BELLANCA 7KCAB CITABRIA C-FZVL
## TORONTO/MARKHAM AIRPORT, ONTARIO
## 03 FEBRUARY 1986

**REPORT NUMBER: 86-O64013 (Incident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 1745 EST**
**OPERATION: Private Recreational**
**DAMAGE: Minor**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 500 | 30 |
| LAST 90 DAYS | 25 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was taking off in a westerly direction from a wet snow-covered area located between a runway and taxiway. During the take-off, the left ski struck a two-foot-high snowbank at the end of the take-off area, and the left axle failed. The aircraft travelled about 1,200 feet and ground looped to the left.

The winds were reported by the pilot to be light and variable from the east. The temperature was three degrees Celsius, and the snow covering was soft. The aircraft was taking off in a downwind direction, from an area approximately 1,200 feet long.

An examination of the failed axle revealed that a fatigue generated pre-crack covered approximately 50 per cent of the fracture surface. The weld which joined the axle to the mounting plate was poor, with numerous voids or gas porosities. The gas porosities in the weld were considered to be the most likely initiation sites of the fatigue pre-cracking.

The aircraft's take-off roll was increased because of the soft snow and the downwind take-off. This resulted in the aircraft travelling farther along the field than normal and striking the snowbank at the end.

The following laboratory report was completed: LP 41/86 - Landing Gear Axle Failure, C-FZVL.

***FINDINGS:***

**Cause Related:**
1. The aircraft's take-off roll was increased because of the soft snow and the downwind take-off.

2. The axle was weakened because of fatigue pre-cracking and a poor weld.

**Other:**
-Nil-

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## DE HAVILLAND DH82C TIGER MOTH CF-CKF
## MILTON, ONTARIO
## 09 FEBRUARY 1986

**BRIEF NUMBER: 86-O/60006 (Accident)**
**LOCAL TIME: 1445 EST**
**OPERATION: Private Recreational**
**DAMAGE: Substantial**
**PILOT LICENCE: Commercial**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,179 | 800 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

During the take-off run, the pilot of the ski-equipped aircraft realized that the aircraft would not clear the fence at the end of the runway. He retarded the throttle, but the aircraft did not stop before it struck the fence.

The runway was covered with sticky snow, and there was a slight tail wind.

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## CESSNA 170B C-FEIU
## TUCK INLET, BRITISH COLUMBIA
## 15 FEBRUARY 1986

**BRIEF NUMBER: 86-P60005 (Accident)**
**LOCAL TIME: 1610 PST**
**OPERATION: Private Training**
**DAMAGE: Substantial**
**PILOT LICENCE: Private**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 55 | 9 |
| LAST 90 DAYS | 16 | 9 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

On final approach, the pilot initiated a small right turn to align the aircraft directly into the wind, and the right float unexpectedly hit the water. The float separated from the aircraft which then rolled over and came to rest submerged. The wind was 10 to 15 mph.

## PIPER PA-12-150 C-GAFC
## LAC PAPINEAU, QUEBEC
## 22 MARCH 1986

BRIEF NUMBER: 86-Q60009 (Accident)
LOCAL TIME: 1202 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 25,000 | 550 |
| LAST 90 DAYS | 215 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***REPORTED CIRCUMSTANCES:***

The pilot had made a flight between the Ottawa River and Lac Papineau in his ski-equipped aircraft. He was accompanied by two passengers. After the landing on the icy surface of the lake, into a wind of about 15 knots, the pilot made a 180-degree right turn toward a bay. While he was taxiing with the engine at idle, the aircraft began to accelerate. The pilot tried to make a right turn, but the aircraft continued to go ahead in a straight line. The pilot then increased the power, while trying to make the turn. The aircraft continued its run until it struck the trees along the lakeshore, at a speed of about 20 knots.

Each ski was equipped with a centre blade for directional stability.

## CONSOLIDATED AIRCRAFT STINSON 108-1
## C-FEZQ
## TSACHA LAKE, BRITISH COLUMBIA 3 mi S
## 02 APRIL 1986

BRIEF NUMBER: 86-P60013 (Accident)
LOCAL TIME: 1500 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student (Expired)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 60 | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The ski-equipped aircraft had taken off and was about 1,500 feet above ground level when the engine vibrated and stopped. During the attempt to land on a frozen lake, the aircraft struck trees and dived onto the ice surface of the lake.

The cause of the engine failure was not determined. The pilot was in possession of a student pilot permit which had expired.

## THISTLE-GREEN LIMITED
## CESSNA A185E (Amphibious) C-FCBB
## BRAMPTON AIRPORT, ONTARIO
## 06 MAY 1986

REPORT NUMBER: 86-O/60030 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1955 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 950 | 200 |
| LAST 90 DAYS | 15 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***SUMMARY REPORT:***

The pilot and two passengers took off on a short visual flight rules (VFR) flight from Brampton Airport to Hamilton, Ontario. Shortly after take-off, when the aircraft was about 200 feet above the ground, the engine (Continental IO520D) slowly lost power. A forced landing was carried out in a field covered with corn stubble, which had been ploughed. Contact with the ground was made in a flat attitude, and, when the amphibious nose gear dug into the surface of the field, the aircraft nosed over.

The engine airbox shaft, part number 0750173-1, had failed in fatigue at a crack which propagated from a drilled hole. Separation of this shaft allowed the extended portion supporting the throttle and mixture controls to move out of the airbox bushing and fall free. Throttle and mixture control inputs were therefore lost.

The Cessna Aircraft Company issued a Service Letter (SE 68) in October 1968 which addressed this problem. The Service Letter stated that this shaft should be replaced within the next 10 flying hours. This problem affected early models of the Cessna A185 (300 hp), series A185-1301 to 1425, according to the Service Letter. C-FCBB was manufactured in early 1969 and may have left the factory with an unmodified shaft installed. It could not be established if this shaft had been replaced during the service life of the aircraft.

The following laboratory report was completed: LP 101/86 - Alternate Air Shaft.

***FINDINGS:***

**Cause Related:**
1. The airbox shaft failed in fatigue, resulting in loss of control input to the throttle and mixture controls, and the subsequent power loss immediately following take-off.

2. The aircraft was force-landed in a ploughed field with the amphibious gear still extended, which resulted in the aircraft's nosing over.

3. The aircraft incorporated an unmodified shaft which failed; however, it could not be determined if this shaft was factory installed or installed at a later date.

**Other:**
-Nil-

***SAFETY ACTION:***

**Action Taken:**
Transport Canada issued Service Difficulty Advisory 86-10 dated 02 September 1986 (subsequently revised on 30 January 1987) which strongly recommended the inspection of the airbox shaft and replacement of the shaft having rivet holes with a compatible one without holes in accordance with the contents of the manufacturer's Service Letter SE 68-28.

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## AERONCA CH-7 CHAMPION C-FMXB
## FREDERICTON, NEW BRUNSWICK
## 11 MAY 1986

REPORT NUMBER: 86-A60013 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1515 ADT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20,000 | 450 |
| LAST 90 DAYS | 23 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot, who was ferrying the aircraft from Nova Scotia to Ontario for the new owner, landed on the Saint John River in Fredericton, New Brunswick, for refuelling. After landing, he inspected the shoreline and attempted to position the aircraft so that it would drift to a selected beaching spot. As he was taxiing, the front of both floats suddenly dipped below the water line. The tail of the aircraft immediately pitched up so that the nose was pointing straight down. The aircraft overturned and was carried by the current and wind toward the shoreline, where several people helped secure it at a sheltered boat dock.

The accident occurred approximately 10 to 15 minutes after landing. The wind was blowing directly across the river and was reported to be gusting as high as 34 knots. The pilot reported that, from the air, the water surface conditions appeared to be acceptable for landing, even though he had indications of strong and gusty winds. When the aircraft overturned, it was taxiing into the current, with a 90-degree cross-wind from the right. The

pilot taxied the aircraft in gusty wind conditions that exceeded the water stability capabilities of the aircraft.

***FINDINGS:***

**Cause Related:**
1. The pilot taxied the aircraft in gusty wind conditions that exceeded the water stability capabilities of the aircraft.

**Other:**
- Nil -

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AEROFAB LA-4-200 N5034L
NIAGARA RIVER, ONTARIO
14 MAY 1986

REPORT NUMBER: 86-O60902 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1100 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)
PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | N/A | N/A | 3,000 | 40 |
| LAST 90 DAYS | N/A | N/A | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The co-pilot, who occupied the left seat, had just completed several touch-and-go landings in a southerly direction on the Niagara River. The captain, in the right seat, was attempting his first touch-and-go. The approach was normal; however on landing, the aircraft struck the water hard, and the aircraft nose began to sink. The cabin began to fill with water, and the crew evacuated the aircraft before it sank. The pilot-in-command was seriously injured. He was not wearing his shoulder harness.

The water at the time of the accident was calm, and the surface winds were light from the south to southwest.

Examination of the wreckage revealed that the left forward section of the hull was ruptured and that this damage was typical of that caused by water impact forces. Both crew members indicated that the aircraft was functioning normally prior to the accident.

The pilot misjudged his height above the water and landed hard. On impact with the water, the aircraft hull was damaged. Water entered the nose section through the ruptured hull, and, as a result, the aircraft sank.

***FINDINGS:***

**Cause Related:**
1. The pilot misjudged his height above the water and landed hard. As a result, the aircraft hull was ruptured on impact, and the aircraft sank.

**Other:**
1. The seriously injured pilot was not wearing his seatbelt.

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CONSOLIDATED AERONAUTICS LAKE LA-4
C-FYUY
TEMPLETON, QUEBEC
25 MAY 1986

BRIEF NUMBER: 86-Q60016 (Accident)
LOCAL TIME: 1620 EDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 680 | 17 |
| LAST 90 DAYS | 18 | 17 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

Shortly after lift-off, the pilot of the amphibious aircraft realized that the rudder was jammed in neutral. Insufficient runway remained to reject the take-off, so he immediately directed the aircraft to the nearby Ottawa River and landed. However, he failed to raise the landing gear, and the aircraft gently nosed over after it touched down. The pilot exited through the broken windshield.

The pilot had not planned to test fly the aircraft until the next day and had left the external rudder gust lock on while taxiing from the tie-down area to the hangar. On

the spur of the moment, he decided to go flying. He used differential braking while taxiing, and failed to detect the locked rudder condition.

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## PIPER PA-18-150 SUPER CUB CF-VNU CONIFER LAKE, ONTARIO 3 mi SW 26 MAY 1986

REPORT NUMBER: 86-C60039 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1000 CDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,000 | 2,000 |
| LAST 90 DAYS | 200 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot of the float-equipped aircraft departed a small lake after emptying minnow traps placed there previously. Shortly after lift-off, the aircraft stalled, struck a tree with the left wing, and descended in an inverted attitude into a rock outcropping. The pilot was seriously injured.

The aircraft was under the maximum allowable weight, and there were no reported unserviceabilities.

The departure was from a lake about 1,500 to 2,000 feet long surrounded by trees and rising terrain. The take-off was in a southeasterly direction to take advantage of the maximum distance available. There was a cross-wind from the northeast with gusts to 10 knots. The temperature was 24 degrees Celsius, and turbulence was encountered shortly after lift-off.

The pilot was not rescued until 11 hours after the occurrence. He had turned off his emergency locator transmitter (ELT) after the crash to conserve the battery. Whenever he heard aircraft in the vicinity, he would turn the ELT back on.

The pilot had operated from this lake previously and without difficulty. However, the area is confined, and the warm temperature, cross-wind, and turbulence combined to affect aircraft performance to the degree that flying speed could not be maintained.

The normal ELT operating procedure is to leave the equipment on until rescued. It is reasonable to expect that the pilot would have been located earlier had this course of action been followed.

***FINDINGS:***

**Cause Related:**
1. The take-off area was of insufficient length given the existing wind and weather conditions.

2. The aircraft stalled because its performance was affected by atmospheric conditions.

**Other:**
1. The recommended procedure for ELT operation was not followed.

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## MAULE M-5-210C LUNAR ROCKET C-GGWN NEPEAN, ONTARIO 31 MAY 1986

REPORT NUMBER: 86-O60041 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1550 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,500 | 1,776 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft took off from the Rideau River just south of Manotick, Ontario, with the pilot and one passenger aboard. The aircraft was heading towards Constance Lake to refuel before proceeding to Brockville, Ontario. During the climb, at an altitude of 1,200 feet above ground level, the engine (Continental IO-360-D33) sputtered and quit. The pilot attempted to restart the engine during the descent but was unsuccessful. Suspecting fuel contamination from the right tank, he switched the fuel selector valve from the right main tank to both tanks. Although another start was attempted, the engine still failed to start. A forced landing was carried out in a field sparsely covered with cedar trees and large shrubs. Upon touchdown, the aircraft slid for 80 feet before the

tip of the left float dug into the soft ground, flipping the aircraft onto its back.

No fault was found with the engine. Once fuel was introduced into the system, the engine started with no hesitation and ran in accordance with the manufacturer's specifications.

Because the aircraft came to rest in an inverted position, it was impossible to acquire any fuel samples from either wing tank. The fuel sample taken from the fuel line that runs from the high pressure pump to the metering unit was a murky, colourless, mixture of water and fuel. Because only a small quantity could be obtained, conclusive testing could not be carried out to determine the percentage of water in the sample. The pilot reported that he had sampled the fuel from the main tanks, through the drain valves located on the exterior of the fuselage and below the passenger's seat. The sample he reported to have obtained was clean fuel with no water present.

The engine stopped because of water contamination in the fuel, but the source of the water was not determined. The aircraft had last flown three weeks prior to the date of the occurrence. It was moored on the shoreline of the Rideau River and was subjected to various weather conditions. It is possible that, over this period of time, water accumulated in the wing tanks because of condensation, and the tanks were not completely drained of the water before the start of the flight. When the pilot drained the tanks, the samples taken could have been of clear water. If no fuel was present to provide a contrast of colour, the pilot would naturally assume the samples to be of pure fuel and stop further draining.

*FINDINGS:*

**Cause Related:**
1. The engine stopped during the climb-out because of water contamination in the fuel from the right wing tank.

2. After the forced landing, the tip of the left float dug into the soft ground, and the aircraft flipped over on its back.

**Other:**
-Nil-

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## LE FEVRE AIR SERVICE
## DE HAVILLAND DHC-2 BEAVER C-FMAW
## PORT ALBERNI, BRITISH COLUMBIA
## 31 MAY 1986

REPORT NUMBER: 86-P60023 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1545 PDT
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,500 | 600 |
| LAST 90 DAYS | 75 | 75 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

*SUMMARY REPORT:*

The aircraft was flying at 700 feet above the ground, with the airspeed reduced and the wing flaps extended 10 degrees, in preparation for landing on the Somass River, adjacent to the Port Alberni Aerodrome. As the pilot applied aileron control to counteract turbulence, he discovered that the controls were stiff, and the ailerons could not be deflected. After regaining some aileron movement by repeatedly raising and lowering the flaps and forceful control input to the ailerons, the pilot landed safely at his destination.

Subsequent examination of the aircraft revealed that the aileron mass balance had failed in flight and jammed the aileron.

A dye-penetrant inspection of the aileron mass balance weight arm had been carried out on 01 October 1985 in compliance with de Havilland Service Bulletin 2/37 and Engineering Bulletin 64/9/83, to check for cracks and corrosion.

Examination of the aileron mass balance assembly at the Canadian Aviation Safety Board (CASB) Engineering Laboratory revealed a traverse failure through the aileron hinge bracket casting in the plane of the topmost rivet. It was concluded that the assembly had failed in a stress-corrosion mode of progressive cracking. The CASB Engineering Laboratory had examined two other similar balance arm failures. In both cases, the failures were attributed to stress corrosion.

The mass balance assembly serves as the centre hinge bracket of the aileron. When failure of the casting and its separation occurred, the mid-section of the aileron raised, causing it to contact the underside of the wing.

The result was binding and loss of control surface movement.

The following laboratory report was completed: LP 132/86-Mass Balance Weight Assembly Failure.

***FINDINGS:***

**Cause Related:**
1. The aileron mass balance weight bracket failed in a stress- corrosion mode of progressive cracking.

2. The aileron control surface movement was impeded when the support casting failed and separated.

**Other:**
-Nil-

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## CESSNA TU206G SUPER SKYWAGON N9471Z GRAND RAPIDS, BRITISH COLUMBIA 3 mi NW 02 JUNE 1986

REPORT NUMBER: 86-P60904 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: Undetermined
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,800 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 4 | - | - |

***HISTORY OF THE FLIGHT:***

The pilot and four passengers departed from Kitsap County Airport, Washington State on Friday 30 May 1986, and flew to a lodge at Trembleur Lake, British Columbia where they were to spend a week fishing.

At 1015 Pacific daylight time (PDT) on Monday 02 June 1986, burning aircraft wreckage, later identified as N9471Z, was located near the Tachie River, 16 miles east of the lodge.

The pilot, his three passengers from Washington State, and the lodge owner were on board at the time of the accident; all received fatal injuries.

***PERTINENT INFORMATION:***

The aircraft had struck the tops of 60-foot-high trees on the bank of the Tachie River. The aircraft's right wing strut was located 290 feet past the initial tree strike, and the main wreckage was found 800 feet beyond that point. The aircraft had struck the ground in a steep, nose-down inverted attitude. A severe post-crash fire had consumed most of the aircraft.

The fishing lodge had no communication facilities, and all those staying at the lodge were on board the aircraft when the accident occurred. However, the lodge owner's diary and tapes from the pilot's video camera provided information about the purpose and conduct of the flight.

The lodge owner completed a diary each evening, and entries described the initial arrival of the flight from Washington, the activities up to and including Sunday evening, and the intention to fly to Fort St. James on the Monday morning.

The pilot owned a video camera which he used to record the loading of the aircraft in Washington, segments of the flight to the lodge, and the activities in the lodge over the weekend. A damaged video tape, which contained film of the final flight, was recovered at the accident site. When the camera was used in the aircraft, it was rigidly installed in a mount on top of the instrument panel, aligned with the aircraft's centre line and pointed forward through the windshield. The camera was fitted with a telephoto zoom lens. The camera also recorded the aural environment of the cockpit, including comments by the pilot and some passengers, engine noise, and the sound of the stall warning system just before impact.

The film of the trip up to the lodge indicates that several segments of the flight were conducted at low level. At one stage, the pilot banked the aircraft steeply to chase a low flying eagle.

The video tape, recovered at the accident scene, shows the take-off from Trembleur Lake, and then the camera was turned off. It was turned on again as the pilot reports seeing a moose in the Tachie River. The aircraft was placed in a steep descending turn to the left as the pilot attempted to locate the moose for the passengers and the camera. The turn was reversed, and the descent continued as the moose was sighted by the passengers. The trees on the river bank then appear on the video, engine power was increased, and the stall warning sounded as the aircraft climbed toward and struck the tops of the trees. The remaining segments of the film were damaged by the post-impact fire.

On the day of the accident, the sky was clear, and the wind was light. The time of the accident could not be positively established.

The pilot was an experienced aerobatic pilot but had not performed any aerobatic flight for several years.

Toxicology results reveal that the pilots blood contained 30 mg% of ethanol (alcohol), 0.02 mg% of valium and trace amounts of codeine, capoten, and caffeine.

The aircraft was equipped with amphibious floats and long-range fuel tanks. The right float contained an unapproved modification which allowed it to carry 55 U.S. gallons of fuel. The actual weight and balance figures were not available for N9471Z, but another aircraft, similarly equipped, had a useful load capacity of about 1,000 pounds. The total weight of the occupants was calculated to be 950 pounds.

No emergency locator transmitter (ELT) was located in the wreckage.

*ANALYSIS:*

From the information available, it would appear that the aircraft was on a visual flight rules (VFR) flight from the lodge on Trembleur Lake to Fort St. James. During the flight, the pilot sighted a moose in the Tachie River. In an effort to ensure that the passengers saw the moose and in order to film it, the aircraft was descended and manoeuvred at low level over the river. The pilot's preoccupation with the moose prevented him from appreciating the aircraft's proximity to the tree-lined river bank that he was heading toward. When the trees were noted, full power was applied, and the aircraft's nose was rapidly raised, but the heavily loaded aircraft failed to respond in time to clear the trees. The sounding of the stall warning horn was probably a result of the rapid nose-up pitch demanded by the pilot when the trees were noted.

Film of the flight up to the lodge shows that the pilot had obtained good video coverage of the trip, much of which had been recorded at low level. While operating at low level, the pilot used large bank angles and abrupt control inputs. No doubt he was confident in performing these manoeuvres because of his experience in low-level aerobatics; however, it had been some years since he had done this kind of flying. At that time, it was planned, and it was performed in a aeroplane designed for aerobatics.

The post-accident fire prevented the actual amount of fuel on board from being established; however, given the occupant's weight of 950 pounds and a useful load capacity of 1,000 pounds, the presence of only minimum fuel would have placed the aircraft over its maximum allowable gross weight. The additional fuel tank in the right float may have added to the severity of the post-accident fire.

The presence of alcohol and valium in the pilot's blood, albeit in small quantities, would have depressed the functions of the pilot's central nervous system and could have adversely affected his judgement.

*FINDINGS:*

**Cause Related:**

1. The pilot, preoccupied with attempts to film a moose, manoeuvred his aircraft at low level and misjudged the aircraft's position in relation to the tree-lined river bank.

2. During the attempt to clear the river bank, the heavily laden aircraft struck the tops of trees.

**Other:**

1. Alcohol and prescription drugs were detected in the pilot's blood.

2. An unapproved fuel tank was installed in the right float.

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CESSNA 185A SKYWAGON C-FOIV
AMOS, QUÉBEC 2 mi S
08 JUNE 1986

BRIEF NUMBER: 86-Q60020 (Accident)
LOCAL TIME: 1200 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 475 | 125 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

As the float-equipped aircraft taxied down the river, it encountered a sudden gust of wind which lifted the right wing. The aircraft tilted over on the left wing, which was extensively damaged from the tip to the strut attachment point when it struck the water surface. The aircraft

remained upright, and the pilot taxied back to its departure point.

The wind was blowing from the right front at 10 to 15 knots, and the waves were up to one and one-half feet high.

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CESSNA 180 C-GPHJ
GOOSE BAY, LABRADOR 77 mi N
08 JUNE 1986

REPORT NUMBER: 86-A60019 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: Approximately 1600 ADT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 450 | 25 |
| LAST 90 DAYS | 22 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 2 | - | - |

***HISTORY OF THE FLIGHT:***

The aircraft owner/pilot and his friends, two German military pilots, left Goose Bay, Saturday 07 June 1986, for an overnight fishing trip at the pilot's fishing camp. The following Tuesday, the pilot's wife alerted the RCMP that her husband's aircraft was overdue. The Canadian Forces launched a search, and they found the aircraft the following Saturday four miles east of the fishing camp. The aircraft had crashed into a treed area and burned on impact Sunday 08 June 1986, at about 1600 Atlantic daylight time (ADT).

***PERTINENT INFORMATION:***

The forecast ceilings over the accident area on 08 June were 1,100 to 1,500 feet above ground, with hilltops in the area obscured in fog. Rain was forecast with visibility between three to six miles lowering in moderate rain and near zero where higher ground was obscured. Forecast surface winds were from the southeast at 15 gusting to 25 knots, causing moderate turbulence below 3,000 feet above sea level. The public forecast (which the pilot considered before the trip) called for sunny sky with afternoon cloudy periods on Saturday; the outlook for Sunday, clouding over followed by showers. Another pilot, who was flying in the accident area on Sunday, 08 June at 1510, reported strong winds and turbulence with visibility affected by many snow showers.

The analysis of the bodies' positions and the autopsies revealed that the aircraft owner was flying the aircraft from the left front seat. The aircraft crashed while in a left-hand spin. Impact forces were mainly vertical; the aircraft contacted the ground first with the left wing tip; the right wing was flung forward 45 degrees from its normal position; there was no swath path through the trees; and the rear fuselage was bent to the left where it contacted a tree in the final seconds of the spin.

The wing fuel cells were ripped apart when the wings broke. The fuel was ignited by the hot engine and the sparks associated with the impact, and the fire burned the centre section of the aircraft. There was no evidence of pre-impact fire.

A detailed examination of the engine and propeller revealed that the engine was developing power at the time of the impact.

The on-site inspection of the control system determined that all the control cables were properly connected. Fire damage prevented an operational check of the controls. The flaps were determined to be up on impact.

The pilot had bought the aircraft in the fall of 1985. He had never flown a Cessna 180 before he bought this aircraft. After the purchase, he received a few circuits of instruction on wheel-skis from a local, experienced Cessna 180 pilot. The pilot had an endorsement for float flying, but he had no training in the Cessna 180 on floats.

The aircraft had flown 19 hours over the 100-hour inspection required by the manufacturer's maintenance manual. A condition and conformity inspection and flight test had been conducted on 11 December 1985.

The take-off weight was estimated at or about maximum allowable weight. The centre of gravity was within allowable limits.

***ANALYSIS:***

A study of the wreckage indicated that the aircraft crashed in a left-hand spin. The reason why the aircraft entered a spin could not be determined. Marginal weather and turbulence would have placed a heavy demand upon a pilot with limited experience on type.

***FINDINGS:***

**Cause-Related:**
1. The aircraft spun into the ground for undetermined reasons.

**Other:**
-Nil-

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## PIPER PA-18A-150 SUPER CUB C-FTBG
## THADDEUS LAKE, ONTARIO
## 22 JUNE 1986

BRIEF NUMBER: 86-C60050 (Accident)
LOCAL TIME: 1330 CDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,500 | 2,000 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

Just prior to touchdown on the lake, gusting winds were encountered, and the pilot landed the aircraft past the intended landing area. There was insufficient distance remaining to safely complete an overshoot, and the aircraft crashed into trees at the shoreline.

The pilot landed toward the east; the wind was from the northwest, gusting to 15 knots.

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## PIPER PA-12 SUPER CRUISER C-FJQH
## POWERVIEW, MANITOBA
## 22 JUNE 1986

REPORT NUMBER: 86-C60049 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1220 CDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 120 | 80 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

***HISTORY OF THE FLIGHT:***

The single-engine float-equipped aircraft departed the Winnipeg River for Kelly Lake, Manitoba. The take-off path was parallel to the west shore of the river in a northwesterly direction, and, immediately after take-off, the pilot began a climbing right-hand turn. After turning through 90 degrees at approximately 200 feet above ground level (agl), the aircraft began to lose altitude, then flicked to the right, and descended vertically onto a peninsula on the east shore of the river. The aircraft was consumed by fire, and both the pilot and the passenger were killed on impact.

***PERTINENT INFORMATION:***

The pilot and passenger had planned two trips to move groceries and camping equipment into Kelly Lake. The weight and centre of gravity of the aircraft were within the authorized limits.

Records indicated that the aircraft was maintained in accordance with prescribed maintenance procedures, and there were no engine or propeller malfunctions, nor was there any evidence of a pre-impact control failure.

Surface winds were from the west at about 11 knots with gusts to 20 knots.

***ANALYSIS:***

The wind was gusty with a strong cross-wind component during take-off. A climbing downwind turn in gusty wind conditions can result in an aircraft experiencing an increasing tail wind with an associated sudden, unexpected decrease in airspeed.

During the turn, which commenced at low level, the pilot may have been looking outside and experienced illusions of drift. This phenomenon can cause a pilot to mistake ground speed for airspeed and either reduce power or pull back on the control column. At a low airspeed, a reduction in power or increase in angle of attack can result in an unexpected power-on stall. The aircraft appeared to stall; however, the reason for the stall could not be determined. The stall occurred at such a low altitude that the pilot was unable to recover. A climb to 1,000 feet agl prior to the turn would have eliminated this illusion of drift and, in all probability, resulted in a normal flight.

*FINDINGS:*

**Cause Related:**
1. A power-on stall occurred for undetermined reasons.

2. There was insufficient altitude to allow for stall recovery.

**Other:**
-Nil-

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## PIPER PA-12 SUPER CRUISER C-FGKH
## BIRCHES LAKE, BRITISH COLUMBIA
## 23 JUNE 1986

REPORT NUMBER: 86-P60030 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0910 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,000 | N/A |
| LAST 90 DAYS | 90 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

*HISTORY OF THE FLIGHT:*

The pilot and passenger took off in the float-equipped aircraft from a river near an outfitter's lodge for a 15-minute flight to transport the passenger and his equipment to a nearby lake. On arrival, the pilot overflew the lake at approximately 600 feet and, to align the aircraft on final approach, turned sharply right. Part way around the descending turn, a witness saw the aircraft roll to an inverted position, dive into the ground, catch fire, and burn. The two occupants were fatally injured.

*PERTINENT INFORMATION:*

At the time of the accident, the winds were gusty and variable in direction, and the air near the surface was turbulent. High scattered clouds were present, and the visibility was unlimited. The temperature was about 14 degrees Celsius.

The maximum allowable take-off weight of the aircraft was 1,838 pounds. The calculated weight of the aircraft at the time of the accident was 2,016 pounds. The aircraft's centre of gravity was calculated to have been within limits for the seaplane configuration. There was no evidence of any pre-impact mechanical discrepancies in the flight controls or the engine. The wing flaps were both extended to the first increment. There was also no evidence that incapacitation, physiological or psychological factors affected the pilot's performance.

*ANALYSIS:*

The pilot banked the aircraft steeply to the right with partial flap extended to align the heavily loaded aircraft with the intended landing path. During the turn, the aircraft stalled, flicked to the inverted position, and dived vertically into the ground. The acceleration forces in the turn would have caused a rapid onset to the stall, and the gusty variable winds and turbulence may have masked pre-stall warnings normally felt through the aircraft's flight controls. Once stalled, there was insufficient altitude available for the pilot to recover the aircraft before it struck the ground.

*FINDINGS:*

**Cause Related:**
1. The aircraft stalled during a steep turn at low altitude.

**Other:**
1. The aircraft exceeded its maximum allowable take-off weight.

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## LAKE LA4-200 (Amphibious) C-GIBB
## PITT MEADOWS SEAPLANE BASE, PITT MEADOWS, BRITISH COLUMBIA
## 24 JUNE 1986

REPORT NUMBER: 86-P60031 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2105 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,100 | 900 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *SUMMARY REPORT:*

After landing the amphibious aircraft on the Fraser River, the pilot lowered the landing gear in order to taxi up the seaplane ramp at the Pitt Meadows Airport. As the aircraft approached the seaplane ramp, its right main landing gear struck a submerged object, and the wing sub-spar on the right side was substantially damaged. The pilot continued to taxi the aircraft up the ramp toward the parking area, and he notified the control tower of the occurrence. He was informed that the seaplane ramp had been in a damaged condition for some time.

The seaplane ramp is connected to a service road and provides seaplane operators with access to and from the airport. The ramp is constructed of timber bolted to piles, and the ramp's dimensions are 50 by 170 feet, with a 1 in 10 slope. The outermost section of the ramp had come adrift, allowing it to move up and down with the movements of the tide. At a certain water level, however, the damaged section of the ramp remained submerged, giving no visible warning to approaching aircraft.

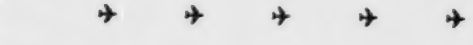
A Notice to Airmen (NOTAM), informing pilots of the damaged seaplane ramp, had been issued on 30 May 1986. This information was carried forward in the updated NOTAM Summary which was on display in the tower building. In addition, the automatic terminal information service (ATIS) had quoted the NOTAM for a 24-hour period when the NOTAM was first issued. Warning markers on the section of the ramp which had become adrift, however, were put in place only after this occurrence.

Although a NOTAM had been issued about the ramp damage, the pilot was not aware of the ramp's condition. Placement of warning flags or markers would have alerted him to the condition.

### *FINDINGS:*

**Cause Related:**
1. The damaged area of the ramp was not identified with warning markers.

**Other:**
1. The pilot did not familiarize himself with the current Pitt Meadows NOTAMs before departure.



## CESSNA 185F SKYWAGON C-GMFG
## BUTTE INLET, BRITISH COLUMBIA
## 29 JUNE 1986

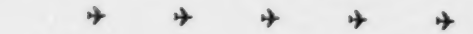
BRIEF NUMBER: 86-P64056 (Incident)
LOCAL TIME: 1545 PDT
OPERATION: Private Company Business
DAMAGE: Minor
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10,000 | 10,000 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

### *REPORTED CIRCUMSTANCES:*

The amphibious aircraft was taking off from rough water when the left float strut collapsed. The right float strut then collapsed, and the aircraft nosed down. During the take-off, the floats had been pounding hard on the waves, overloading the float supports.



## DE HAVILLAND DHC 2 MK III BEAVER C-GMET TORONTO/BUTTONVILLE AIRPORT, ONTARIO 8 mi N 10 JULY 1986

REPORT NUMBER: 86-O/64111 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1947 EDT
OPERATION: Private Recreational
DAMAGE: None
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,600 | 800 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*SUMMARY REPORT:*

The aircraft had departed Buttonville Airport, Ontario on a flight to Baysville, Ontario and had levelled off at 3,000 feet above ground when the engine (United Aircraft of Canada PT6A-6A) stopped. The pilot was unable to restart it, and he carried out a successful forced landing onto Highway 404.

A fuel leak had developed in a high pressure fuel line of the fuel manifold. The leak interrupted the fuel flow to the engine, causing it to flame out. The leak was caused by a twisted O-ring seal located between the fuel manifold transfer tubes and the corresponding fuel manifold adapter assembly.

The O-rings had been changed on the engine seven months previously. In the interval, the aircraft had operated 25 hours without incident. The O-ring was twisted slightly on installation; however, the ring was still able to function as a seal. The twisted condition then worsened with use to the point where the leak developed.

*FINDINGS:*

**Cause Related:**
1. The engine flamed out as a result of a fuel leak which was caused by a distorted O-ring.

2. The O-ring distortion was caused by improper installation.

**Other:**
-Nil-

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## CHAMPION CHALLENGER 7GCB C-FGOP LAC LAMBERT, QUEBEC 16 JULY 1986

REPORT NUMBER: 86-Q60029 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 2000 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 300 | 200 |
| LAST 90 DAYS | 12 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The float-equipped aircraft with two people on board had just taken off from a small lake in a hilly region. Because of obstructions, the pilot attempted to fly through a small valley, where he encountered rapidly rising terrain. The aircraft struck trees and crashed. The occupants, who were uninjured, were rescued about four hours later by a Search and Rescue (SAR) aircraft. SAR had been alerted by the emergency locator transmitter (ELT).

The weather was suitable for visual flight rules (VFR) flight. The winds were light and variable, and the temperature was 26 degrees Celsius. The crescent-shaped lake provided a take-off run of 3,200 feet and was surrounded by hills rising up to 600 feet; the surface of the lake was 1,000 feet above sea level (asl), and, at the time of the occurrence, the density altitude was 2,500 feet.

No malfunctions were reported with the aircraft, and the engine was producing normal power. The aircraft weight was 54 pounds below the maximum allowable, and the centre of gravity was within the prescribed limits.

The pilot, who was familiar with the area, had flown about 50 hours on floats and held a float rating. He stated that the aircraft became airborne on the third take-off attempt and that he had rejected the first two take-offs because of the shifting wind and the slow acceleration of the aircraft. According to the Koch chart for temperature and altitude effects, published in the Transport Canada Flight Training Manual, at an altitude

of 1,000 feet, with a temperature of 26 degrees Celsius, the take-off run would be increased by about one third and the rate of climb reduced by one quarter.

The performance of the aircraft was affected by the high density altitude. The wind had shifted on the previous take-off attempts, and it is possible that the same occurred on this occasion. Once airborne, there remained insufficient space for the aircraft to clear the obstructions, and the pilot had to take an alternate route which was unsuitable because of rising terrain.

***FINDINGS:***

**Cause Related:**
1. The pilot took off under environmental and atmospheric conditions which exceeded the aircraft capability.

**Other:**
- Nil -

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## CESSNA A185E SKYWAGON C-FAUI
## ST. ANDREWS, MANITOBA
## 16 JULY 1986

REPORT NUMBER: 86-C60063 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0720 CDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 600 | 80 |
| LAST 90 DAYS | 40 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | 1 | 2 | - |

***HISTORY OF THE FLIGHT:***

Four friends and co-workers, one of them the pilot/owner of the aircraft, met early in the morning to fly to a remote lake north of Winnipeg for a one-day fishing trip. After the pilot drained the fuel sumps and completed a daily inspection, they took off from the river in a northwesterly direction. As the aircraft crossed the riverbank, the engine lost all power. The pilot banked right in an attempt to land on the river, but there was insufficient altitude remaining. The aircraft tore through a stand of trees and came to rest on the upper tier of a stepped rock garden. Moments later, the aircraft burst into flames. Three of the occupants escaped with injuries, but the fourth was unable to extricate himself, and attempts to rescue him were unsuccessful.

***PERTINENT INFORMATION:***

The weight and balance were within the prescribed limits, and the aircraft was in a serviceable state prior to departure. The weather was suitable for the flight, although relatively hot temperatures and high humidity levels prolonged the take-off run. Subsequent to the previous flight, accumulated rainfall of up to 60 millimetres had been recorded in the area.

The aircraft had been refuelled from a portable storage tank. The fuel was found to be clear and uncontaminated. The pilot had drained all sumps and the gascolator in accordance with accepted procedures, and no water was found.

The engine (Continental I0-520D) was removed and examined and found capable of producing power. Fuel lines from the fuel distributor to the injector nozzles were checked for fuel, and none was found. The fuel-air metering unit and engine driven fuel pump were disassembled and were found to contain water droplets. No odour of gasoline was present. Analysis of other parts of the system was not possible because of the fire damage. In particular, it could not be determined if the fuel cap O rings provided a proper seal.

***ANALYSIS:***

The water drops found in the fuel pump and in the fuel-air metering unit were significant, as was the lack of fuel odour. It is known that fuel vapours in gasoline containers are removed by the process of steaming. Water in the above components changed to steam in the wreckage fire and removed all gasoline odours. As cooling took place, the steam condensed into the water droplets that were noted during disassembly. It was concluded that water contaminated fuel was present in the fuel system and caused the loss of engine power.

Given the rainfall accumulation previous to the flight, it is probable that water seeped into the fuel tanks through the caps located in the upper side of the wing. However, this could not be determined with certainty.

The passenger occupying the right front seat was unable to escape because of injuries suffered in the crash.

***FINDINGS:***

**Cause Related:**
1. The engine lost power because of fuel contaminated by water from an undetermined source.

2. Insufficient altitude was available to conduct a safe forced landing.

**Other:**
- Nil -

## CESSNA 180 SKYWAGON C-FIBK
## WHITEFISH LAKE, ONTARIO
## 19 JULY 1986

BRIEF NUMBER: 86-C60068 (Accident)
LOCAL TIME: 1630 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 406 | 212 |
| LAST 90 DAYS | 18 | 18 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot had intended to land in the narrow bay. After the round-out, the aircraft continued to float and finally settled abruptly on the water. The pilot pulled back on the elevator control, and the aircraft became airborne again. The pilot initiated a go-around but then discontinued it because of the confined area and the rising terrain ahead. He reduced power completely, and the aircraft stalled and landed hard.

The wind was blowing from the left at 15 to 20 knots, and the pilot did not anticipate that the aircraft would remain airborne beyond the touchdown point.

## PIPER PA-18-150 SUPERCUB C-FUFJ
## BELLA COOLA RIVER, BRITISH COLUMBIA
## 22 JULY 1986

BRIEF NUMBER: 86-P60038 (Accident)
LOCAL TIME: 2015 PDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,750 | 1,700 |
| LAST 90 DAYS | 50 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The aircraft took off from the river after approximately 300 feet of the take-off run. After lift-off, the pilot lowered the wing flaps one notch, and the aircraft suddenly rolled left. The pilot used aileron control to compensate; the aircraft levelled but drifted left and did not respond further to either aileron or rudder control. The pilot reduced power and aimed for an opening between two trees. The aircraft struck the ground hard, resulting in substantial damage.

The take-off area was located between high mountains, about 500 feet above sea level. In the direction of the take-off, there were tall trees on the left and a high river bank on the right. There were strong gusty winds blowing at the time of the accident.

## CESSNA 172M C-GERA
## LAC PARADIS, QUEBEC
## 26 JULY 1986

BRIEF NUMBER: 86-Q60038 (Accident)
LOCAL TIME: 1430 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 542 | 200 |
| LAST 90 DAYS | 50 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot, accomapnied by one passenger, took off from Lac Paradis bound for Lac Rouleau 50 miles further north. The wind was from the southwest at 30 miles per hour, and the surface of the lake was covered with whitecaps. The pilot took off toward the north. During the initial climb, the pilot began a turn to the right in order to have a tail wind. At a height of about 200 feet, when the aircraft came close to the rugged terrain along the western shore of Lac Paradis, the aircraft was suddenly caught in a downdraft, and it struck the ground.

## CESSNA A185F SKYWAGON N53002
## OPATACA LAKE, QUEBEC
## 27 JULY 1986

REPORT NUMBER: 86-Q60903 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1715 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,200 | 50 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | 1 | - | 1 |

***HISTORY OF THE FLIGHT:***

Following take-off from a runway, the amphibious aircraft landed on the water at its destination. Prior to landing, the pilot circled the landing area to check for obstructions and then carried out a pre-landing check. He did not confirm that the landing gear was retracted. The aircraft touched down on the water and nosed over. The windshield shattered, and the cabin immediately filled with water. The front-seat occupants unbuckled their seat-belts and escaped from the aircraft. The rear-seat passenger, for whom there was no seat-belt, was knocked unconscious during the impact; the other occupants were unable to rescue him, and he drowned.

***PERTINENT INFORMATION:***

The aircraft was equipped with an indicator which shows a blue light when the landing gear is retracted and an amber light when the landing gear is extended. The pilot reported that the indicator system was functional on previous flights, although he omitted to check the indicator on the last pre-landing check. There were no reported problems with the aircraft.

The aircraft weight exceeded the certified amphibious maximum gross weight by approximately 273 pounds, but this would not have affected the aircraft's landing characteristics. The centre of gravity was within limits.

***ANALYSIS:***

The pilot did not complete the required post-take-off and pre-landing check for water landings and did not confirm that the landing gear was retracted. Contact between the extended wheels and the water surface caused the aircraft to nose over.

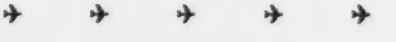
***FINDINGS:***

**Cause Related**
1. The pilot did not complete the required post-take-off and pre-landing check for water landings.

2. The landing gear was in the extended position when the aircraft landed on the water.

3. The rear-seat passenger, for whom there was no seat-belt, was knocked unconscious during the impact; the other occupants were unable to rescue him and he drowned.

**Other:**
1. The aircraft weight exceeded the certified amphibious maximum gross weight by 273 pounds.



## PIPER J3-C65S CUB C-FPBD
## LAC AU FOIN, QUEBEC
## 27 JULY 1986

BRIEF NUMBER: 86-Q60037 (Accident)
LOCAL TIME: 1600 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 120 | 80 |
| LAST 90 DAYS | 40 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

After taking off along the full length of Lac au Foin, the pilot made a left turn at about 300 feet agl. During the turn, the aircraft stalled and crashed into the river. The lake where the aircraft took off is narrow and there are steep hills rising 1,200 feet above the surface along the sides of the lake. The lake is a widening in a river and measures about 3,000 feet at its widest part; this is where the pilot began the turn. The pilot sustained slight cuts to the head on impact and was burned by unidentified chemicals in the water.

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## CESSNA 180J SKYWAGON N9908N
## LAC JÉRÉMIE, QUÉBEC
## 30 JULY 1986

BRIEF NUMBER: 86-Q60904 (Accident)
LOCAL TIME: 1900 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,200 | 300 |
| LAST 90 DAYS | 30 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***REPORTED CIRCUMSTANCES:***

The aircraft was taking off from a small lake. The passenger sitting in the right front seat was also a qualified pilot. The pilot lifted off and started a climbing left turn to clear trees on the shore; the nose of the aircraft was lowered to pick up some speed before climbing. As the aircraft was getting closer to the shore, the passenger pulled sharply on the control column, and the aircraft mushed into the trees.

The aircraft was equipped with a Robertson short take-off and landing (STOL) kit, and the pilot reported normal operation up to the point of the passenger's involvement.

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## CESSNA 175 CF-KET
## KELOWNA, BRITISH COLUMBIA 10 mi S
## 03 AUGUST 1986

REPORT NUMBER: 86-P60040 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1500 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 466 | 53 |
| LAST 90 DAYS | 1 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The pilot was taking off from a lake, and as the aircraft became airborne, the left wing contacted the water, and the aircraft cartwheeled.

The take-off in a southeasterly direction was commenced from a sheltered cove which leads to an open area of Okanagan Lake. The wind was reported to be gusting to 20 miles per hour from a southwesterly direction and was causing white caps in the open area of the lake.

The pilot's total flying experience on type was 53 hours, and he had flown one hour in the last 90 days.

The aircraft was serviceable at the time of the occurrence, and the weight and centre of gravity were within the prescibed limits.

The initial take-off run was normal while the aircraft was sheltered from the wind. However, as the aircraft entered the open lake area, a gust from the right caused the aircraft to lift off prematurely. The pilot who was relatively inexperienced on floats did not immediately compensate for the cross-wind and was unable to prevent the aircraft from settling back onto the water surface in the left-wing-low attitude. The left wing tip struck the water, and the aircraft cartwheeled.

***FINDINGS:***

**Cause Related:**
1. The pilot did not compensate for the gusty cross-wind condition when he reached the open area of the lake.

**Other:**
-Nil-

CESSNA 140 CF-FPI
LEWIS LAKE, NOVA SCOTIA
04 AUGUST 1986

REPORT NUMBER: 86-A60025 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1330 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,800 | 30 |
| LAST 90 DAYS | 45 | 19 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***SUMMARY REPORT:***

The aircraft, with the pilot and one passenger on board, was departing from a small lake. Once the aircraft had climbed above the tree-top level, the pilot turned left to avoid flying over houses at the end of the lake. After completing the turn, the engine (Continental C90) lost power. The aircraft descended and crashed into trees approximately 2,000 feet from the edge of the lake.

The aircraft was operating at just under the maximum allowable take-off weight, from a lake approximately 2,000 feet long. The temperature was 23 degrees Celsius, and the dew point was 21 degrees Celsius. A four-knot cross-wind component from the right was present. The pilot stated that he noticed a sudden drop of about 100 rpm in engine speed after he had completed the turn. The temperature and dew point spread was conducive to moderate carburettor icing at cruise power. There are no performance charts published for this aircraft when operating on floats.

An examination of the engine did not reveal anything that would explain the sudden drop in engine rpm. However, the low compression on three of the four cylinders indicates that the engine was incapable of producing full-rated power.

The sudden drop in engine rpm experienced after take-off could have been caused by carburettor icing. Because of the low compression on three of the four cylinders, the remaining engine power was insufficient for the aircraft to maintain altitude.

***FINDINGS:***

**Cause Related:**
1. The engine rpm decreased for undetermined reasons.

2. The remaining engine power was insufficient for the aircraft to maintain altitude because the compression on three of the engines four cylinders was low.

**Other:**
-Nil-

382820 ONTARIO LIMITED
CESSNA A185F SKYWAGON C-GQVG
CORDNER LAKE, ONTARIO
07 AUGUST 1986

BRIEF NUMBER: 86-O/60068 (Accident)
LOCAL TIME: 1330 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 306 | 101 |
| LAST 90 DAYS | 101 | 101 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot was landing at Cordner Lake after a flight from O'Sullivan Lake. The wind at Cordner Lake was 120 degrees at 10 knots, and the pilot decided to land in an easterly direction. The aircraft touched down about half-way across the lake, then suddenly became airborne again. The aircraft was airborne for about 500 feet before touching down a second time approximately 100 feet from shore. The pilot could not stop the aircraft, and it slid 25 feet up on the beach, coming to rest in some bush.

The landing path was about 2,300 feet long, and the lake is surrounded by 50-foot trees. Because of the short distance remaining after the initial touchdown, the pilot did not attempt an overshoot.

## PA-18-105 SUPER CUB C-FJLE
## MOUNT ANDERSON, BRITISH COLUMBIA
## 09 AUGUST 1986

REPORT NUMBER: 86-P60043 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2000 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | 1 | - |

### *HISTORY OF THE FLIGHT:*

The pilot and his passenger took off in the early evening on a pleasure flight from the lake in front of the pilot's house. It was to have been a short round trip to a lake 20 miles to the southwest. After take-off, the pilot turned left while climbing to overfly the northwest slope of Mount Anderson en route to the destination.

The aircraft did not return that evening, and it was discovered crashed on the northwest side of Mount Anderson the following day. A Search and Rescue team found the deceased pilot at the crash site and located the severely injured passenger the next day about a mile from the crash.

### *PERTINENT INFORMATION:*

Residents of the area reported that the wind was calm and that the clouds were high scattered. The temperature was about 23 degrees Celsius, and the Environment Canada weather report taken after the accident indicated that light downdrafts may have been present in the cool shadowed north slopes of the mountains along the route of the flight.

The pilot had not had an aviation medical for some years; however, his personal physician stated that he was in good health. Medical tests and examinations did not reveal any condition which may have contributed to the accident.

The flight was a spur of the moment decision, after a normal day's activities, and they departed at about 2000 PDT, during the hours of daylight. The pilot, who was familiar with the terrain, had flown the route a number of times, and, when he and his passenger did not return, it was presumed that they had landed elsewhere because of weather and that they would return later. No alarm was given.

At about 1500 PDT on 10 August, a pilot overflying the crash site in a helicopter heard the downed aircraft's emergency locator transmitter (ELT) and located the wreckage. The Rescue Coordination Centre (RCC) was alerted, and a rescue operation was organized.

The aircraft had crashed into trees on the 60-degree slope of the mountain. The wreckage trail was oriented about 90 degrees right of the direct track to the destination. The fuselage came to rest 200 feet downhill from the initial point of contact. The pilot was thrown free, and the passenger remained in the aircraft until it came to a stop. He later wandered off in search of water. No pre-occurrence discrepancies, which may have contributed to the accident, were found with the aircraft.

### *ANALYSIS:*

The weather should not have been a factor as the visibility was good and the air was not turbulent. However, it is probable that there were areas of subsiding air on the cool, shadowed north slope of the mountain. Once subsiding air was encountered the aircraft's climb performance would have been degraded. However, the reasons why the pilot altered heading to the right and why the aircraft struck trees on the mountain slope were not determined.

### *FINDINGS:*

**Cause Related:**
1. The cause of the crash could not be determined.

**Other:**
1. The pilot's medical validation certificate had expired.

## PIPER PA-18A SUPER CUB C-FWBQ
## VERNON, BRITISH COLUMBIA 5 mi SW
## 10 AUGUST 1986

REPORT NUMBER: 86-P60045 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1222 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 1,000 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | 1 | - |

### *SUMMARY REPORT:*

The float-equipped aircraft was on a visual flight rules (VFR) flight over Okanagan Lake, British Columbia, when the pilot noticed some friends in a boat. The pilot landed alongside the boat and arranged to take one of the occupants for a short flight. At the end of the flight, the pilot reported that, in preparation for landing, he flew over the boat at 500 feet and then commenced a steep left turn through 180 degrees. During the turn, the nose of the aircraft dropped, and, while the aircraft was rolling out of the turn, it struck the water in a steep nose-down, right-wing-low attitude. The pilot escaped from the aircraft and then re-entered to free the seriously injured passenger.

Except for the small ripples created by the passage of boats, glassy water conditions existed at the time of the accident. The surface winds were calm, the sky was clear, and the visibility was unrestricted.

There were no reported aircraft mechanical deficiencies prior to or during the flight.

The pilot was unable to recall the speed at which the final turn was made, but he stated that the turn was performed with the throttle set at near idle. He did not apply power prior to impact with the lake.

Eyewitnesses reported that the left turn was commenced at an altitude of less than 100 feet over the lake. The aircraft lost altitude in the turn and was in a nose-down, right-wing-low attitude at the completion of the turn when it struck the water.

It is possible that, because of the glassy water conditions, the pilot misjudged his height over the lake at the beginning of his turn. On completion of the turn, the aircraft was at a much lower altitude than intended by the pilot, and the aircraft struck the surface of the lake as the pilot was preparing to land.

### *FINDINGS:*

**Cause Related:**
1. While preparing to land, the pilot allowed the aircraft to descend during a steep, low-level turn over glassy water, and the aircraft struck the lake in a nose-down, right-wing-low attitude.

**Other:**
-Nil-

## CESSNA 172H SKYHAWK CF-VBX
## SHARKEY'S CHANNEL, MANITOBA
## 15 AUGUST 1986

BRIEF NUMBER: 86-C60080 (Accident)
LOCAL TIME: 2000 CDT
OPERATION: Private Other
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 150 | 75 |
| LAST 90 DAYS | 12 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *REPORTED CIRCUMSTANCES:*

The pilot landed the float-equipped aircraft on the Winnipeg River near Pinawa. As the aircraft approached the shore during the landing run, the pilot turned left into a channel to have more distance in which to stop. During the turn, the pontoons struck submerged objects, and the aircraft spun to the left. The aircraft came to a stop 50 feet from shore where the occupants disembarked. The aircraft then rolled over and sank as the damaged pontoons filled with water.

## CESSNA 180C SKYWAGON C-FNZF
## GRIST LAKE AIRPORT, ALBERTA
## 17 AUGUST 1986

BRIEF NUMBER: 86-W60047 (Accident)
LOCAL TIME: 1930 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 241 | 88 |
| LAST 90 DAYS | 18 | 18 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

### *REPORTED CIRCUMSTANCES:*

During the landing, the pilot had noted that the 3,000-foot strip was rough for the small nosewheels on the amphibious floats. To prevent damage to these wheels, he used a soft-field technique on the subsequent take-off. Full power was applied, the brakes were released, and the column was held fully back. When the nosewheels were off the ground, the pilot released some of the back pressure on the controls. At 55 miles per hour, the pilot applied back pressure on the control column. The aircraft became airborne. However, the nose dropped, and the aircraft yawed right. The aircraft struck the water surface of the lake at the end of the runway and nosed over in about four feet of water.

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## CESSNA A185F C-GZDK
## LAKE MUSKOKA, ONTARIO
## 17 AUGUST 1986

REPORT NUMBER: 86-O/60072 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1354 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 396 | 135 |
| LAST 90 DAYS | 14 | 14 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | 1 | - | - |

### *HISTORY OF THE FLIGHT:*

The amphibious aircraft took off from Lake Muskoka and was at an altitude of approximately 400 feet over a group of islands, when the engine suddenly lost power. The pilot executed a steep right turn of about 120 degrees in an attempt to reach open water beyond the islands. During the turn, the aircraft lost airspeed and altitude rapidly. The pilot levelled the aircraft for a forced landing in a narrow channel between two islands. While levelling off for touchdown, the pilot observed the boat-house in front of him and opened the throttle, which he had closed during the turn. The engine responded but not in time to avoid striking the boat-house. While still airborne, the aircraft struck the boat-house with the left float, wing, and horizontal tail plane. The aircraft then fell into the water and sank. A fire broke out immediately when fuel from the ruptured left fuel tank ignited. The fire quickly spread throughout the roof and wooden frame of the boat-house. The pilot was able to extricate himself from the wreckage while it was submerged. The passenger, who also extricated himself from the wreckage, drowned.

### *PERTINENT INFORMATION:*

Examination of the engine fuel system and its accessories revealed that a small section of teflon tape, which was used as a thread seal on the vapour jet pump unit of the engine driven fuel pump, was lodged near the inlet side of the jet pump. The teflon tape was a non-fuel soluble type, which was not recommended by the manufacturer. The engine driven fuel pump assembly was last overhauled four years prior to the accident. A pilot who had flown the aircraft a month before the accident had reported a sudden and unexplained loss of power accompanied by surging while in flight and had made a precautionary landing on a lake. The engine was examined by a licensed mechanic who could not duplicate or find the reason for this condition. The aircraft was flown to an overhaul base, and a compression test revealed low compression on four of the six cylinders. All cylinders were overhauled and reinstalled. The engine then operated a further six hours without incident until the day of the accident.

The aircraft was equipped with shoulder harnesses, but they were not in use by either occupant at the time of the crash. The emergency locator transmitter did not function, most probably as a result of immersion in the water.

### *ANALYSIS:*

The small piece of teflon tape had been used as a thread seal when the pump was screwed into the body of the en-

gine driven fuel pump. It was still attached to the threads by a thin strand of teflon. A piece of the teflon had broken off and had entered the inlet side of the minute ejector-type pump. This pump transfers unwanted fuel vapours and excess fuel back to the fuel tank. If the pump becomes inoperative, vapours may then be passed to the engine fuel metering unit, resulting in erratic operation of the engine. The jet vapour pump also works in parallel with a return line orifice and its relief valve. The relief valve is adjusted while maintaining an uninterrupted flow of fuel through the jet vapour pump orifice. If this orifice is blocked, then all excess fuel is routed through the main orifice, resulting in the pressure relief valve unseating and the fuel pressure dropping, causing a loss of pressure to the injectors. This could result in engine surging and explain the rapid loss of engine power at altitude and power restoration when the pilot opened the throttle.

The pilot received serious head injuries. The passenger drowned as a result of a broken neck. Injuries would have been minimized had the shoulder harnesses been used.

The following laboratory report was completed: LP 193/86 - Fuel Pump Contamination Analysis.

*FINDINGS:*

**Cause Related:**

1. The engine lost power at low altitude because the engine driven fuel pump malfunctioned when a piece of teflon tape entered the inlet of the vapour jet pump.

2. During the forced landing attempt in a narrow channel, the aircraft struck the boat-house and sank.

3. The injuries sustained by the occupants would have been minimized had the shoulder harnesses been worn.

**Other:**

1. The teflon tape was a non-fuel soluble type, which was not recommended by the manufacturer.

## PIPER PA-12 CF-YMU
## YELLOWKNIFE, NORTHWEST TERRITORIES
## 21 AUGUST 1986

REPORT NUMBER: 86-W60049 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2015 MDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 430 | 2 |
| LAST 90 DAYS | 45 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The owner of the aircraft was receiving float instruction from another pilot. On the accident flight, the aircraft lifted off at an airspeed just above stall, flew over the water in a nose-high attitude, and crossed the shoreline; it then stalled, entered a spin, and crashed into a rocky area in an inverted, nose-down attitude.

Neither pilot had previously flown this model of aircraft on floats. The floats had been installed on the aircraft just prior to the accident flight. During the run-up, before the accident flight, the engine reached 2300 rpm, just under the desired 2325 minimum static rpm.

A calibration of the engine tachometer following the accident found it to be reading 75 rpm high, indicating that less than maximum horsepower was being developed. Internal wear was discovered on the distribution gear bearings in one of the magnetos. This allowed the distributor gear rotor to bang against the pick-up towers, causing the engine to deliver less than rated power.

During the take-off run, the engine was not developing full power. The pilot was not familiar with this aircraft's flying characteristics and was probably unaware of the lack of power.

The pilot attempted to get the aircraft airborne at too low an airspeed, and, as a result, the aircraft mushed along until it stalled and spun into the ground.

*FINDINGS:*

**Cause Related:**
1. Neither pilot had previous experience flying this model of aircraft on floats.

2. The engine was developing less than rated power.

3. The aircraft became airborne at too low an airspeed to maintain flight.

**Other:**
-Nil-

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CESSNA 172M C-GCQX
TORONTO HARBOUR, ONTARIO
28 AUGUST 1986

REPORT NUMBER: 86-O/60080 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1740 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 150 | 100 |
| LAST 90 DAYS | 65 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The pilot had just received his float endorsement from the Department of Transport earlier in the day. On this trip, the pilot and passenger departed Toronto Harbour on a local visual flight rules (VFR) flight to fly circuits within the Toronto Island Airport Positive Control Zone. During the fourth landing, the aircraft touched down heading 300 degrees and in a slight nose-down, left-wing-low attitude. The left float dug in, and the aircraft veered to the left and nosed over. After the aircraft came to a stop in the inverted attitude, both occupants exited the aircraft and were picked up by local pleasure craft.

The weather observation taken at 1700 EDT on 28 August 1986 at the Toronto Island Airport was as follows: cloud 4,000 feet scattered, estimated ceiling 9,000 feet broken, visibility 15 miles; the temperature and the dew-point were 15 degrees Celsius and 5 degrees Celsius respectively; and the wind was from 280 degrees magnetic at 10 gusting to 17 knots. Cumulonimbus clouds were observed to the east and to the south. The wave height in Toronto Harbour was reported to be about 18 inches.

The Transport Canada Flying Training Manual recommends that, when landing in rough water, the aircraft be landed in a positive nose-up attitude, equivalent to the attitude of the aircraft when in slow flight. It further states that a smooth landing may be made in almost any attitude, as long as the pilot moves the control column steadily back as the aircraft contacts the water. In this case, a positive nose-up attitude was not established prior to landing, and progressive back pressure on the control column was not maintained as the aircraft contacted the water.

The pilot had been trained to fly on floats by the passenger, who was a qualified floatplane instructor. The pilot indicated that he was influenced by the passenger, his former instructor, to land in an unsuitable area, but the passenger denied this. The passenger attempted to take control just prior to the aircraft striking the water. The relationship between the pilot and the passenger and the circumstances of the flight produced some role confusion between the two occupants which probably contributed to causing the accident.

*FINDINGS:*

**Cause Related:**
1. The pilot did not employ the correct water landing technique, and, as a result, the left float dug into the water, and the aircraft nosed over.

**Other:**
-Nil-

✈ ✈ ✈ ✈ ✈

## ROYAL CANADIAN MOUNTED POLICE DE HAVILLAND DHC-2 BEAVER C-FMPQ WOLLASTON LAKE ICE STRIP, SASKATCHEWAN 08 JANUARY 1986

REPORT NUMBER 86-H60001

PILOT HOURS:

| | PILOT | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 5,501 | 503 | 260 | 79 |
| LAST 90 DAYS | 94 | 91 | Unknown | 79 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 2 | - | - |
| PASSENGERS | 2 | - | - |

### *History of the Flight*

At 1300 central standard time (CST), on 08 January 1986, a wheel/ski-equipped de Havilland DHC-2 (Beaver), C-FMPQ, departed the Welcome Bay ice strip at Wollaston Lake, Saskatchewan. This was the second leg of a flight that originated at La Ronge, Saskatchewan. On board were two Royal Canadian Mounted Police (RCMP) pilots, another member of the force, and an inspector from the Saskatchewan Department of Public Works. Witnesses stated that the aircraft took off normally, levelled momentarily, then climbed steeply into cloud. Moments later, they heard the engine noise increase abruptly, then decrease rapidly, followed by a sound similar to a backfire. When the aircraft reappeared, it was in a steep, nose-down, right-wing-low attitude. It crashed on the ice, one mile north of Welcome Bay; all four occupants sustained fatal injuries.

The accident occurred at lat 58°06' N, long 103°11' W at approximately 1300 in the hours of daylight.

### *ANALYSIS*

The investigation focused on witness observations of the flight; the weather, including the possibilities of icing and carburettor icing; and the decision to initiate the flight.

### *CONCLUSIONS*

**Cause-Related Findings**

1. Aircraft control was lost for undetermined reasons.

**Other Findings**

1. The pilot departed Wollaston Lake into known icing conditions in an aircraft that was not certified for flight into such conditions.

2. There was no evidence of any airframe failure or system malfunction prior to or during the flight.

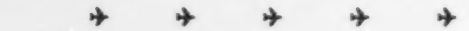
3. The flight crew was certified and qualified for the flight in accordance with existing regulations.

4. The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

5. The aircraft's weight and centre of gravity were within the prescribed limits.

### *SAFETY ACTION*

The CASB is not issuing any Recommendations deriving from this occurrence at this time.



## RISK OF COLLISION BETWEEN: CESSNA C185 SKYWAGON C-GMNT and SIKORSKY SEA KING (Helicopter) CF419 CANADIAN FORCES BASE SHEARWATER, NOVA SCOTIA 22 JANUARY 1986

LOCAL TIME: 1449 AST
INFORMATION SOURCE: Field Investigation

CESSNA 185 SKYWAGON C-GMNT
REPORT NUMBER: 86-A64101 (Incident)
OPERATOR: Province of Nova Scotia Department of Lands and Forests
OPERATION: State
DAMAGE: None
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 8,000 | 800 |
| LAST 90 DAYS | 65 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SIKORSKY SEA KING (Helicopter) CF419
REPORT NUMBER: 86-A64101 (Incident)
OPERATOR: Canadian Forces
OPERATION: State
DAMAGE: None
PILOT LICENCE: Not required

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 4 |
| PASSENGERS | - | - | - |

***HISTORY OF THE FLIGHT:***

The Cessna 185 aircraft was conducting a bird count along the south coast of Nova Scotia. The pilot requested and was granted permission to transit through the Shearwater Control Zone at 500 feet. The controller advised the pilot of "numerous helicopters" in the area, but not of the exact number, nor of their altitudes. The pilot spotted two helicopters but failed to see a third which had to take avoidance action to maintain separation.

***PERTINENT INFORMATION:***

The helicopter crew had established visual contact with the Cessna and had altered course to maintain separation. Just before they were to pass, the Cessna made an unexpected turn toward the helicopter. There is no radar for the control of visual flight rules traffic at Shearwater. Neither aircraft was using landing lights, and the helicopter was painted in camouflage colours. The Cessna was on very high frequency (VHF) radio, and the helicopter was on ultra high frequency (UHF) radio. The helicopter pilot took avoidance action by making a rapid descent.

***ANALYSIS:***

In visual conditions, the responsibility for maintaining sufficient separation between aircraft rests with the pilots. In this case, the risk of collision was reduced because the helicopter crew had visual contact with the Cessna. The Cessna pilot never did see the helicopter, but the chances of seeing the helicopter would have been increased if landing lights had been used. The Cessna pilot only became aware of the situation after it was reported to him. It is possible that, as the distance between the aircraft decreased, the engine cowling of the Cessna was obstructing the pilot's line of sight to the helicopter.

***FINDINGS:***

**Cause Related:**
1. The pilot of the Cessna did not have visual contact with the helicopter.

2. After the helicopter had manoeuvred to provide separation, the Cessna made an unexpected turn, causing a risk of collision.

**Other:**
1. Neither aircraft was using landing lights.

2. The fact that the two aircraft were operating on different radio frequencies contributed to the Cessna pilot's not being aware of the position of the helicopter.

ORIOLE AIR LIMITED
ROBINSON R22 (Helicopter) C-GTSX
EDMONTON/ST. ALBERT AIRPORT, ALBERTA 5 mi S
08 JANUARY 1986

REPORT NUMBER: 86-W60001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1220 MST
OPERATION: Specialty Aerial Inspection, Reconnaissance and Advertising
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,300 | 900 |
| LAST 90 DAYS | 240 | 240 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The helicopter was in cruise flight when the pilot heard an unusual noise from the rear of the helicopter. He descended immediately to land, but, as he increased power to enter a hover, the pilot heard a loud bang from the rear of the helicopter, and the helicopter began to rotate to the right. It struck the ground heavily, the skid gear collapsed, and the helicopter rolled onto its right side.

The tail rotor drive shaft had failed at the weld fillet of the drive-shaft tube and flange section, adjacent to the tail rotor gear box. Excessive wear was noted in the grooves of the lower pulley sheave of the tail rotor belt drive clutch.

The mode of failure of the tail rotor drive shaft was unidirectional, low cycle, bending fatigue with numerous sites of origin. It was considered that the failure was due to abnormal loads at each start-up. The excessive wear on the grooves of the lower pulley sheave caused the belts to grab, resulting in higher than normal loads on the tail rotor drive shaft.

Factory maintenance inspection criteria for the lower pulley sheave dictate that ridges or steps caused by wear in excess of 0.006 inch would be cause for replacement. In this instance, the excessive wear produced no steps, but the hard anodizing was worn, and the pulley should have been replaced. Prior to the incident, the operator had adopted an unauthorized procedure for engaging the tail rotor drive in order to avoid the belt grabbing instead of grounding the aircraft until the problem was isolated. This procedure, while only required for the first start of the day, involved switching the actuator off then on, causing a hard engagement and resulting in additional loads to the tail rotor drive. The cause of the noise noted by the pilot in flight was not determined but may have been associated with the tail rotor shaft failure. When the shaft failed as the pilot was applying power to enter the hover, the pilot was unable to regain control of the helicopter before it struck the ground.

The following laboratory report was completed: LP 25/86 - Tail Rotor Drive Shaft.

*FINDINGS:*

**Cause Related:**
1. The tail rotor drive shaft failed in fatigue due to the drive belts grabbing during start-up.

2. Undetected excessive wear in the grooves of the lower sheave pulley caused the belts to grab during belt drive clutch engagement.

3. The operator adopted an unauthorized procedure for engaging the tail rotor drive instead of grounding the aircraft until the cause of the belt grabbing was isolated.

4. The tail rotor drive shaft failed as the pilot was applying power on entry to the hover, and the pilot lost directional control.

5. The maintenance manual inspection procedures covering the wear limitations for the lower pulley grooves did not take into account the type of wear found in this particular clutch installation.

**Other:**
-Nil-

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## VIKING HELICOPTERS LTD
## HUGHES 369-D (Helicopter) C-GYTX
## LACHUTE, QUEBEC
## 29 JANUARY 1986

REPORT NUMBER: 86-Q60002 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1302 EST
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7,103 | 633 |
| LAST 90 DAYS | 18 | 18 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

During take-off on a training flight, the helicopter was in transition when an abnormal sound was heard coming from the engine, followed by an acceleration of the turbine. The instructor immediately took the controls to autorotate. The helicopter landed hard, the tail was cut in two by the main rotor, and the aircraft turned on its side.

An examination of the transmission revealed that the upper and lower webs of the ring gear carrier (ref. no 369D25132) had failed.

Optical examination of the upper web fracture established that the failure was due mainly to fatigue. The fracture originated on the inside surface of the web and was coincident with a continuous annular zone of remelted material. This remelted zone is caused by electron beam impingement which can occur during welding of the lower web at the time of manufacture. The engineering drawing specifies the limits of the remelted zone. A metallurgical sectioning through this zone indicated that the limits were exceeded in this case. This remelted zone promoted the concentration of adverse stresses. When the transmission failed, the helicopter was at low altitude over a wooded area. The pilot did a partial autorotation and extended his flight until he landed hard on a snowmobile trail.

When the carrier webs of one transmission ring gear were welded, the manufacturing standards were not adhered to. As a result, adverse stresses concentrated and created fatigue, which, in turn, led to the initiation of the failure. After the failure occurred, the pilot was forced to extend the flight to avoid landing in the wooded area.

Because the flight was extended, the main rotor speed decreased, and this led to the hard landing.

The following laboratory report was prepared: LP 32/86 - Transmission Failure, Hughes 369D, C-GYTX.

*FINDINGS:*

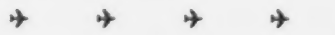
**Cause Related:**
1. A manufacturing defect led to the failure of the aircraft's transmission ring gear.

2. The failure of the transmission ring gear occurred after take-off while the aircraft was flying low over a wooded area, and the pilot had to extend the flight to reach a road. As a result, main rotor speed decreased, and the helicopter landed hard.

**Other:**
-Nil-

*SAFETY ACTION:*

**Action Taken:**
The manufacturer issued a Service Information Notice (DN 148), dated 23 April 1987, requiring mandatory inspections of the output shaft assembly within 100 hours and every 300 hours or annual inspection thereafter until such time that the integrity of the assembly is confirmed by an ultrasonic inspection. Eventually the output shaft assembly will be replaced with a new one. The Federal Aviation Administration (FAA) plans to issue an Airworthiness Directive covering this inspection and replacement. In addition Transport Canada will feature the failure occurrence in a forthcoming issue of its helicopter safety newsletter vortex.



## ROBINSON R22 (Helicopter) C-GFPY SAULT STE. MARIE/PARTRIDGE POINT, ONTARIO 02 FEBRUARY 1986

**BRIEF NUMBER: 86-O60004 (Accident)**
**LOCAL TIME: 1215 EST**
**OPERATION: Specialty Flying Training**
**DAMAGE: Substantial**
**PILOT LICENCE: Student Pilot**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 80 | 80 |
| LAST 90 DAYS | 80 | 80 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 0 |

*REPORTED CIRCUMSTANCES:*

The student pilot was on a solo training flight and had been flying for about two hours. While he was initiating a hovering pedal turn to the left, the right skid of the helicopter struck the ground, and the helicopter rolled onto its right side.

The landing surface was snow covered, and the pilot had difficulty estimating his height above the surface.

## SEALAND HELICOPTERS LTD AEROSPATIALE AS 332L SUPER PUMA (Helicopter) C-GSLK ST. JOHN'S, NEWFOUNDLAND 238 mi E 24 APRIL 1986

**REPORT NUMBER: 86-A64026 (Incident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 1435 NST**
**OPERATION: Charter**
**DAMAGE: Minor**
**PILOT LICENCE: Commercial Rotorcraft**

PILOT HOURS:

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 6,080 | 629 | 2,200 | 250 |
| LAST 90 DAYS | 60 | 60 | 70 | 70 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | 8 |

***HISTORY OF THE FLIGHT:***

The helicopter was on a scheduled personnel rotation flight to the oil rig platform SEDCO 709, located 238 nautical miles to the east of St. John's, Newfoundland. On arrival at the rig, a NDB/RAD instrument approach was commenced. The rig was not visible at the pilot-in-command's minimums (150 feet, one-half mile visibility); so a missed approach was carried out. During the missed approach, the rig was sighted off to the left. A second NDB/RAD approach was flown to 200 feet, one-half mile visibility, and this too was followed by a missed approach. The rig was sighted again during the missed approach, and the crew attempted a third approach at a higher minimum altitude. The rig became visible at 500 feet asl and one-half mile visibility, and the co-pilot took control to complete the approach and landing. A higher than normal rate of descent developed, and, before this could be completely arrested, the helicopter struck the water. The flotation gear was inflated, and the helicopter remained upright. The engines were shut down, and the crew evacuated the passengers into a life-raft. The crew and passengers were quickly rescued by personnel from the rig's support vessel, which had dispatched a Fast Rescue Craft. The helicopter was subsequently recovered and placed on the aft deck of a rig support vessel.

***PERTINENT INFORMATION:***

Flight operations in the vicinity of the SEDCO 709 were being affected by fog and low ceilings. Ceilings were reported as indefinite 200 to 900 feet obscured in the six hours prior to the occurrence. The visibility varied from one eighth to one and one-half mile in light drizzle and fog in the same period. The weather observation from the rig at the time of the occurrence was indefinite ceiling 200 feet obscured; visibility one-quarter mile in fog; temperature five degrees Celsius, dew point five degrees Celsius; wind velocity 170 degrees magnetic at six knots; altimeter setting 30.34 inches of mercury; in remarks, visibility to the north one-half mile.

Pilots who meet the criteria laid down in the company operating manual can fly to limits of ceiling 150 feet and visibility one-half mile; the pilot-in-command met these criteria and the co-pilot did not. A NDB/RAD approach is not to be continued beyond the two nautical mile point inbound, unless a qualified observer on the rig platform reports that the visibility is at least one-quarter mile. The visibility was reported at one-quarter mile with one-half mile to the north of the rig.

Prior to flying the approach, the crew discussed the procedure to be used. The helicopter had sufficient fuel for three approaches, leaving adequate fuel for alternate requirements. It was agreed that the pilot-in-command would fly the approach, with the co-pilot doing the radar vectoring. When the rig became visual, at or above minimums, the co-pilot was to take control and complete the approach, and land on the rig platform. Company procedure states that the pilot-in-command conducts the radar vectoring, and, when the rig becomes visual, he takes control and carries out the landing.

The second and third approaches were flown at higher than published minima, 200 feet and 300 to 500 feet. These modified approaches were prompted by the unusual weather conditions which had permitted the crew to observe the rig clearly during the two missed approaches. During the third approach, the crew had vertical visual contact at all times, and the rig became visible at 500 feet asl and one-half mile visibility.

When the speed was stabilized at 48 knots indicated airspeed (KIAS) which was 22 knots lower than the normal 70 knots, the pilot-in-command handed over control to the co-pilot and continued to monitor the flight instruments and call out altitudes. After the occurrence, the co-pilot stated that he saw the rig clearly but that there was limited visual reference, glassy water conditions, and no definite horizon. It appeared to him that the rig was "floating in space" and that he had little by which to judge his rate of descent. This information was not conveyed to the pilot-in-command during the approach. The pilot-in-command advised the co-pilot that his altitude was decreasing and that his vertical speed was increasing rapidly to 1,000 feet per minute (fpm). The co-pilot added some power in an attempt to overshoot, but the helicopter continued to shudder and sink. The pilot-in-command, who had assumed control at this time, realized that they were going to strike the water and pulled maximum power in an effort to cushion the landing and level the helicopter. The helicopter struck the water with an estimated vertical speed of 200 to 300 fpm, with little forward speed.

***ANALYSIS:***

Based on their weather observations of the fog during the first approach, the crew altered the approach and did not descend to MDA on the second and third approach while flying a modified IFR procedure. As well, the co-pilot was permitted to vector the helicopter during the approach and then assume control for the intended landing.

The pilot-in-command decided to reduce the KIAS at the MDA so that the co-pilot would have less speed to lose when transitioning to the hover. When the speed was allowed to decrease further during the approach, the probability of a successful overshoot was further restricted. The use of 70 KIAS at the MDA is predicated

on ensuring a successful overshoot, if it is required on final.

As the approach was continued with the co-pilot at the controls, the glassy water conditions, the indefinite horizon and the poor visual reference limited the co-pilot's depth perception. He could not judge his rate of descent and was only aware of the high rate when he was warned by the pilot-in-command. By this point, the helicopter, at a low power setting and slow KIAS, began to judder. Partial power was applied in an effort to reduce the rate of descent, but the helicopter was slow to respond. This flight condition of low power, slow speed, and high rate of descent is characteristic of settling with power.

The pilot-in-command, who took control at this time, applied maximum power in an effort to arrest the rate of descent and to overshoot. However, there was insufficient altitude remaining in which to recover. The helicopter struck the water one-quarter mile from the oil rig.

*FINDINGS:*

**Cause Related:**
1. The crew modified the approach procedure because of the reduced horizontal visibility near the ocean surface.

2. The light winds, poor depth perception, and glassy water conditions provided little or no visual references.

3. The crew allowed the aircraft to develop a high sink rate from which full recovery was not possible prior to striking the water.

**Other:**
-Nil-

## MAPLE LEAF HELICOPTERS INC.
## AEROSPATIALE AS 350B (Helicopter) C-GATX
## NESTING LAKE, ONTARIO
## 04 MAY 1986

**REPORT NUMBER:** 86-C60034 (Accident)
**INFORMATION SOURCE:** Field Investigation
**LOCAL TIME:** 2010 EDT
**OPERATION:** Contract
**DAMAGE:** Substantial
**PILOT LICENCE:** Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,500 | 750 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

*HISTORY OF THE FLIGHT:*

The pilot and aircraft were employed on a mineral survey contract. At about 2000 EDT, the pilot and a survey equipment operator departed their base camp for a transponder site 10 miles away. They intended to replace the batteries of the portable transponder with new ones.

On arrival over the site, the 100-foot kevlar cable attached to the battery box was hooked up to the helicopter. The box was then slung a short distance to a relatively clear area on the shore of a beaver pond, and the pilot set the aircraft down about 30 feet to the right of the box. The equipment operator stepped out of the left door and began coiling the cable in beside the aircraft. Neither person noticed that a section of cable near the battery case had snagged on a dead tree, approximately 15 feet high. As the cable was pulled in and became taut, it was contacted by the rotating main rotor blades and was severed. The unsecured end of the cable wrapped around the helicopter swash plate. Immediately after the cable contacted the rotor blades, the pilot shut the helicopter down. The swash plate assembly was substantially damaged.

*PERTINENT INFORMATION:*

The aerial survey operation was conducted over wilderness terrain. Transponders were attached to trees at various points in the bush, for use as tracking aids; the battery boxes were positioned by a cable at the bases of those trees. The transponder batteries were changed every five to six days, depending upon usage. Standard procedure was to maintain engine power during the ground operation unless the cable snagged, in which case the engine was to be shut down.

Both the pilot and the equipment operator, who had worked together on many occasions, were qualified to perform their respective duties and were experienced in this type of operation.

*ANALYSIS:*

The reason for neither the pilot nor the equipment operator noticing the snagged line was not determined; however, the routine nature of the job may have been a factor. The equipment operator did not follow the path of the cable to the battery box prior to commencing the retrieval.

There was no evidence to suggest that the pilot saw the cable snagged on the tree or that he was looking in that area.

*FINDINGS:*

**Cause Related:**
1. The crew did not ascertain whether the cable was clear of snags before the equipment operator coiled it in beside the running helicopter.

2. When the snagged cable was severed by the main rotor blades, the unsecured end of the cable wrapped around the swash plate, causing substantial damage.

**Other:**
-Nil-

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OKANAGAN HELICOPTERS LTD.
BELL 206B (Helicopter) C-FKOD
FAR MOUNTAIN, BRITISH COLUMBIA
06 MAY 1986

BRIEF NUMBER: 86-P60018 (Accident)
LOCAL TIME: 1400 PDT
OPERATION: Specialty Aerial Inspection, Reconnaissance and Advertising
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6,832 | 5,521 |
| LAST 90 DAYS | 179 | 179 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

*REPORTED CIRCUMSTANCES:*

The helicopter took off from a snow-covered mountain slope where the visibility was reduced in falling snow and fog. After flying about 200 feet, the pilot became disoriented because of the falling snow, very low visibility and featureless white terrain, and inadvertently flew toward the mountain. The right skid struck the ground, and the helicopter rolled over.

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CAN-DU AIR LTD.
BELL 47G2 (Helicopter) C-FGUT
WHITE LAKE, ONTARIO
18 MAY 1986

REPORT NUMBER: 86-O/60037 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0600 EDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial Helicopter

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,200 | 790 |
| LAST 90 DAYS | 25 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot lifted the helicopter up off the truck-mounted platform, 10 feet above ground level, and departed over the back of the truck on the first spray flight of the season. As the helicopter flew out over the calm lake, the left skid contacted the water, and the helicopter nosed down into the lake. Witnesses reported hearing a loud bang or slapping noise as the helicopter nosed in. The pilot was able to escape from the helicopter and swim back to the shore. The helicopter sank in 15 feet of water.

The helicopter was recovered and examined, and it was determined that there were no pre-impact faults with the helicopter or engine.

After the accident, the pilot was not able to state with certainty the quantity of fuel on board or the weight of the chemical spray he was carrying. Therefore, investigators were not able to determine the weight of the helicopter at the time of the accident. It was, however, estimated to be close to its maximum gross weight.

The take-off from the narrow, truck-mounted platform was one which leaves very little margin for error. The pilot was not in a position to do a hover-check and to feel the weight of his aircraft to determine if he had enough power to fly with a given load. When the pilot initiated the take-off, he could not judge the response of the helicopter until it became airborne. Once airborne, any slight movement of the helicopter in any direction would have made it difficult to land back on the platform. Therefore, when the pilot initiated the take-off, he had to follow through with it.

The one advantage the pilot had was that he could afford to lose 10 feet of altitude while gaining forward airspeed. In this instance, the pilot was not current on the helicopter or the platform take-off technique, and he was performing a very precise manoeuvre with a heavily loaded helicopter. The exact correlation between the rate of sink of the helicopter and its weight could not be determined. This, together with his lack of depth perception during the take-off run across the glassy water surface of the lake, made it extremely difficult to judge and control the helicopter's altitude above the lake surface.

The bang heard by the witness was determined to have come from the main rotor blade when it struck the surface of the lake as the helicopter nosed down into the water.

*FINDINGS:*

**Cause Related:**
1. The pilot misjudged his altitude above the glassy water, and the helicopter's skid contacted the water during the take-off run, causing the helicopter to pitch nose-down into the lake.

**Other:**
-Nil-

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## QUASAR HELICOPTERS LIMITED
## BELL 206 L1 (Helicopter) C-GQZT
## BANFF, ALBERTA 20 mi W
## 13 JUNE 1986

**REPORT NUMBER:** 86-W60021 (Accident)
**INFORMATION SOURCE:** Field Investigation
**LOCAL TIME:** 1200 MDT
**OPERATION:** Charter
**DAMAGE:** Substantial
**PILOT LICENCE:** Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,000 | 750 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | – | – | 1 |
| PASSENGERS | – | – | 4 |

*SUMMARY REPORT:*

The pilot dropped off four passengers on the top of Protection Mountain, with equipment necessary to service the repeater site. The pilot returned to Protection Mountain at 1130 MDT and, on landing, shut down the helicopter. The four passengers and the equipment were loaded, and the pilot lifted off into a hover. At about 50 feet above the take-off altitude, the engine-out horn came on, and the pilot immediately lowered the collective and turned back toward the mountain. The helicopter touched down on a 25-degree, snow-covered slope and rolled down the slope. When the helicopter stopped rolling, the pilot shut down the engine, and all five occupants escaped without injury.

Preliminary examination of the engine (Allison 250-C28B) was carried out in situ. The only discrepancy noted was that the "B" nut on the fuel nozzle was not lockwired and had loosened by one half a flat.

The fuel nozzle was removed and tested separately with the "B" nut loosened to about the position noted during the preliminary examination. The fuel flow measured 50 pounds per hour (pph), below the maximum flow of 295 pph. The "B" nut was then tightened on the fuel nozzle for the remainder of the tests. During the tests, the power turbine (N2) hesitated at 40 per cent rpm; however, because this was below the operating range, it was not considered contributory to the accident. The engine performed satisfactorily during all other test phases.

At the time of the occurrence, the density altitude was 9,900 feet; however, the density altitude achieved during the tests was 1,450 feet.

In the manufacturer's maintenance manual, there is conflicting documentation as to whether or not the "B" nut should be lockwired after purging the fuel system. Under section 73-00-00, pp. 209 - 210, para. D(5), the manual states to reconnect the fuel supply line to the fuel nozzle. Under section 73-10-03, para. 4, p. 202, it states to secure with lockwire.

The combination of high density altitude and the loose "B" nut could not be duplicated during the engine testing. Therefore, it could not be determined what effect these two conditions would have had on the engine performance. Neither condition, taken in isolation, should have caused an engine power reduction sufficient to activate the engine-out system. The cause of the power loss was not determined.

*FINDINGS:*

**Cause Related:**
1. The cause of the engine power loss was not determined.

**Other:**
1. The "B" nut on the fuel supply to the nozzle was loose, which resulted in a fuel flow reduction of 50 pph at maximum fuel flow.

2. The manufacturer's maintenance manual contains contradictory documentation concerning the requirements to lockwire the fuel supply "B" nut.

*SAFETY ACTION:*

**Action Taken:**
The Canadian Aviation Safety Board alerted the manufacturer, (via Transport Canada and the Federal Aviation Administration) of the discrepancy between sections of the Allison 250-C28B engine maintenance manual with respect to the "B" nut lockwiring requirement. It is understood that the manufacturer intends to incorporate an applicable amendment into the next revision of the Model 250-C28 Series Engine Operation and Maintenance Manual.

## CHINOOK HELICOPTERS LTD.
## BELL 47G2 C-FETR
## COLUMBIA VALLEY, BRITISH COLUMBIA
## 23 JUNE 1986

**REPORT NUMBER: 86-P60028 (Accident)**
**INFORMATION SOURCE: Field Investigation**
**LOCAL TIME: 1430 PDT**
**OPERATION: Specialty Flying Training**
**DAMAGE: Substantial**
**PILOT LICENCE: Student Permit**

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 61 | 61 |
| LAST 90 DAYS | 61 | 61 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The helicopter, flown by a student pilot on a supervised solo flight, departed from the Abbotsford Airport to the practice area in the Columbia Valley, 16 miles east. During the first practice landing, the helicopter made a hard landing, and the aft section of the tail boom was cut off by the main rotor blades.

For previous landings in this area, the pilot had determined the wind direction by observing a nearby flag on a pole or clothes on a line, but, at the time of the accident, neither of these indications was present.

The pilot had made two reconnaissance circuits of the landing area and then decided to look for a positive indication of the wind direction. He flew over a nearby lake, which was 200 feet lower than the landing area and surrounded by trees; by looking at the waves on the lake, he concluded that the wind was from the northeast. The pilot returned to the landing area and made a trial approach to the northeast; he then commenced the landing approach to this direction. During the approach, he had to lower the collective control and reduce power more than usual. At about 50 feet above ground level, the helicopter began to sink rapidly, and the pilot responded by increasing power and raising the collective control; however, the helicopter continued to sink, and the main rotor rpm decayed below the green arc. The helicopter then landed hard, bounced back up into the air, and the main rotor blades chopped off the aft section of the tail boom; following this, the helicopter spun around several times and fell to the ground.

It was estimated that the wind was from the west at 5 to 10 mph at the time of the accident.

The lake which the pilot used to determine wind direction was sheltered from the wind by the surrounding trees and therefore did not give the pilot an accurate indication of the wind direction at the landing area. The pilot was unable to determine the wind conditions during his trial approaches to the landing area, and, following his observation of the lake, he attempted the landing with a tail wind. As a result, the ground speed of the helicopter on the approach was faster than normal, and the pilot compensated for this by lowering the collective and reducing power. The airspeed then decreased until the helicopter lost translation and, as a result, started to descend rapidly.

When the pilot attempted to arrest the helicopter's descent, the main rotor rpm decayed, and the final result was the hard landing.

**Cause Related:**
1. The pilot misjudged the wind direction and attempted to land with a tail wind.

2. The pilot was unable to arrest a high sink rate on final approach; as a result, the helicopter landed hard.

3. The pilot did not recognize the need to go around during the early stages of the approach.

**Other:**
-Nil-

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OKANAGAN HELICOPTERS LTD.
BELL 206B (Helicopter) C-GTQP
DIVING ELEPHANT LAKE, NORTHWEST TERRITORIES
02 JULY 1986

REPORT NUMBER: 86-W60026 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1600 MST
OPERATION: Commercial
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 17,500 | 10,000 |
| LAST 90 DAYS | 78 | 78 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot and engineer were assigned a leased helicopter and were based at a remote tent camp in support of an exploration company. The pilot was slinging drums of fuel to the camp from a location two miles across the end of the lake. Slinging gear consisted of 2 five-foot lanyards and two barrel hooks, one interconnected by a bungee cord. After slinging six drums, the pilot set down near the seventh drum, got out of the helicopter, and hooked up this drum. After hook-up, he climbed back into the helicopter and noted in the inside mirror that the lanyard was hanging down as he expected. On lift-off, the lanyard still appeared to be normal; so he continued flight into translation. At an altitude of about 20 feet, the pilot was unable to control the helicopter as it rolled right into a nose-down attitude and struck the ground. The pilot exited through the cockpit window.

The leased helicopter used for this support operation was not modified with an outside mirror, although this modification is normal for slinging operations. The pilot was not comfortable with an inside mirror; however, he tolerated it to complete the slinging operation.

Other company personnel were available for sling hook-ups, but the pilot elected to do his own hook-ups and retrieve the lanyards on every drop. Because available company personnel were not used for hook-ups, an additional five-foot lanyard was attached to the existing five-foot lanyard. The extra length enabled the pilot to set down close to the drum, get out of the helicopter, and attach the barrel hooks.

Marks on the right skid forward of the front crosstube and paint embedded in the lanyard indicated that the lanyard was hooked over the skid on lift-off.

The lanyard became hooked over the front of the right skid, but, because of the poor visibility afforded by the inside mirror, the pilot did not notice the situation developing. With the lanyard hooked over the skid to a forty-five gallon drum, the helicopter became uncontrollable on lift-off and rolled right in a nose-down attitude.

***FINDINGS:***

**Cause Related:**
1. The lanyard became hooked over the front of the right skid, causing the helicopter to become uncontrollable.

2. Other company personnel were available for hook-up but not used.

3. The helicopter was not equipped with an outside mirror for slinging.

**Other:**
-Nil-

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QUASAR HELICOPTERS LTD.
BELL 47-G3B2 (Helicopter) C-FXFV
DOWNIE SLIDE, BRITISH COLUMBIA
04 JULY 1986

BRIEF NUMBER: 86-P60035 (Accident)
LOCAL TIME: 1145 PDT
OPERATION: Specialty Aerial Photography and Survey
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 500 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***REPORTED CIRCUMSTANCES:***

The helicopter was flying from survey monument 104 to survey monument 105 near the Downie Slide. Approaching the landing pad the helicopter began a descent which the pilot was unable to arrest. He began a right turn intending to fly over a cliff edge and thus regain airspeed. During this manoeuvre, the helicopter struck tree stumps and rolled over before it reached the downslope.

Pad 105 is located at 4,500 feet above sea level on a mountainside and is surrounded by trees on three sides with the other side open to a drop-off over a cliff. The engine later tested serviceable, and the helicopter was being operated within weight and balance limits. There was a light breeze, and the temperature was about 15 degrees Celsius.

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ATHABASKA AIRWAYS LTD.
BELL 206B (Helicopter) C-FDMY
HEBDEN LANE, SASKATCHEWAN
04 JULY 1986

BRIEF NUMBER: 86-C60057 (Accident)
LOCAL TIME: 1300 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,500 | 700 |
| LAST 90 DAYS | 80 | 80 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

After releasing, on a dock, a sling load of loosely packed personal effects belonging to a geological survey crew, the pilot observed the load roll into the water. He manoeuvred the helicopter to engage the sling netting with the toe of the right skid and attempted to place the load back onto the dock. The helicopter could not be flown with the load because of inadequate cyclic control, and the pilot then attempted to facilitate recovery by moving the load through the water toward the shore. During the attempt, the helicopter rolled over into the water and sank.

There was an estimated cross-wind from the left at 15 to 25 knots at the time of the occurrence.

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VIKING HELICOPTERS LTD.
AEROSPATIALE AS350D (Helicopter) C-GVDR
CHIBOUGAMAU, QUEBEC 12 mi E
08 JULY 1986

REPORT NUMBER: 86-Q60027 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1625 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,500 | 80 |
| LAST 90 DAYS | 72 | 72 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The helicopter was on a flight to pick up some passengers, and, while en route, the pilot decided to perform an engine (Lycoming LTS-101-600A-2) power check. At an altitude of 1,750 feet above ground level (agl), the engine revolutions suddenly dropped to approximately 30 per cent. The pilot started an autorotation, turned into the wind, selected a landing area, and declared an emergency. When the pilot attempted to extend the glide to clear trees, the main rotor rpm decreased, and the helicopter's rate of descent increased. During the landing flare, the helicopter's tail rotor struck a tree, and, on touchdown, the rotor blades severed the tail boom. The helicopter rolled onto its right side, and the pilot escaped without injury. The emergency locator transmitter (ELT) was manually activated.

The wind was from the west at 10 knots, and the temperature was 15 degrees Celsius; the cloud base was at 10,000 feet, and the visibility was in excess of 15 miles. The area selected for the landing was a small lake surrounded by a marsh and high trees; the area was the best landing site available.

The helicopter was maintained by a qualified aircraft maintenance engineer (AME); no outstanding snags were reported prior to the accident. The engine teardown after the accident revealed that a blade in the gas producer (GP) module turbine had failed; analysis of the failed blade showed that a fatigue pre-crack existed prior to the final instantaneous overload. Several identical failures had been previously analysed by the Canadian Aviation Safety Board Engineering Laboratory.

A Service Bulletin was issued by the engine manufacturer, recommending the installation of an improved GP turbine rotor assembly on certain types of engines. A revised Service Bulletin was later issued, increasing the number and types of engines subject to this replacement, and then Airworthiness Directive (AD) 86-10-04 was issued, requiring immediate compliance with the Service Bulletin for this particular engine. During the inspection prior to purchasing the helicopter, the company chief engineer misidentified the module as being one already modified ; upon issue of the AD, it was considered to have been complied with, and the helicopter was operated with an unmodified GP module.

The failure of the GP rotor blade caused excessive vibration and a high temperature in the engine, which led to the collapse of bearings and the partial loss of power. Because the company chief engineer had misidentified the GP turbine assembly, the appropriate AD was therefore not complied with, and the engine was operated beyond the permitted time limit. During the autorotation, the main rotor revolutions decreased as the pilot tried to extend the normal glide to reach the intended landing site; as a result, a high sink rate developed close to the ground and resulted in a hard landing.

The following laboratory reports were completed: LP 162/86- Turbine Assembly Failure AS350, C-GVDR; and LP 186/86-ELT Analysis Astar, C-GVDR.

*FINDINGS:*

**Cause Related:**
1. The failure of a turbine blade in fatigue and overload caused the engine to lose power.

2. The gas producer turbine rotor assembly was not modified as required by the appropriate Airworthiness Directive.

3. During the pre-purchase inspection, the company chief engineer did not properly identify the gas producer turbine assembly as one requiring modification to conform to an Airworthiness Directive.

**Other:**
-Nil-

ATHABASKA AIRWAYS LTD.
BELL 206B JETRANGER (Helicopter) C-GQLH
CARLSON CREEK SOUTH, SASKATCHEWAN
08 JULY 1986

REPORT NUMBER: 86-C60060 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1300 CST
OPERATION: Contract
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,160 | 565 |
| LAST 90 DAYS | 150 | 95 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

*HISTORY OF THE FLIGHT:*

The helicopter was engaged in moving a drill rig to a new location on rugged terrain in northern Saskatchewn. The pilot had just delivered a load of drill rods to the site and had manoeuvred the helicopter downhill in front of the rig to wait for the slings to be put on board for the return flight. The pilot was balancing the helicopter with the right skid resting on the sloping terrain and the drill rig on his right when the main rotor blades cut through a hydraulic hose on the drill machine and struck the heavy steel bedplate. The impact broke a large portion off one rotor blade and tore the helicopter's transmission from its mounts. The transmission then struck the pilot on the head fatally injuring him. The pilot was not wearing a helmet.

*PERTINENT INFORMATION:*

The pilot was experienced and very confident of his ability. He had, however, occasionally placed himself in situations where, in order to save time or effort, the margin of safety was markedly reduced; for example, four days before this accident, he had been involved in another accident in which he had attempted to recover a sling load in a net that had fallen into a lake by hooking the net with the tip of one skid; the resulting forces induced dynamic roll-over and caused the helicopter to crash into the lake. The pilot was not injured, and there was no evidence to indicate that his performance had been affected by the accident.

There was no evidence of any pre-accident malfunction of the helicopter. The weather was excellent with good visibility and light winds.

The drill rig was being set up on a rocky hillside. A helicopter landing pad had been established approximately 150 feet uphill from the rig. The standard procedure, after delivering loads at the site, was for the helicopter to fly up to the landing pad and wait for the slings to be brought up to it for the return flight.

*ANALYSIS:*

After delivering the sling load to the drill site, the pilot chose to remain at the drilling site rather than proceed uphill to the helicopter landing pad to wait for the slings to be brought up and loaded on board. The pilot placed the helicopter in a position that did not provide sufficient clearance between the main rotor blades and the drill rig, and the main blades struck the drilling machine.

The investigation could not determine why the pilot manoeuvred the helicopter in an unsafe manner, but it is probable that his consideration for safety was adversely affected by his confidence in his flying abilities and his desire to save time.

Had the pilot been wearing a helmet, it is possible that his injuries would not have been fatal.

*FINDINGS:*

**Caused Related:**
1. The pilot moved the helicopter too close to the drill rig, and the main rotor blades struck the drilling machine.

2. The pilot was not wearing a helmet.

**Other:**
- Nil -

PRECISION HELICOPTERS INC.
BELL 206B (Helicopter) C-GOPU
NAHANNI BUTTE, NORTHWEST TERRITORIES
26 mi SW
29 JULY 1986

REPORT NUMBER: 86-W60039 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2030 MDT
OPERATION: Charter
DAMAGE: Destroyed
PILOT LICENCE: Commercial Helicopter

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 717 | 622 |
| LAST 90 DAYS | 309 | 309 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 2 | 1 | - |

*HISTORY OF THE FLIGHT:*

The helicopter, on a charter flight, picked up three hunters camped in the mountains. Shortly after lifting off, the helicopter entered cloud and struck a mountain ridge. The aircraft disintegrated and caught fire as it rolled down the far side of the mountain. One passenger was seriously injured but survived; the pilot and the other two passengers sustained fatal injuries.

*PERTINENT INFORMATION:*

The surviving passenger (a fixed-wing pilot), had been seated in the left front seat of the helicopter with a dog on his lap; he reported that the helicopter arrived at the camp in very marginal weather conditions, and, at the time of take-off, the visibility was estimated to be 30 to 40 feet in fog and mist. The pilot lifted off immediately, and the helicopter was airborne before the surviving passenger fastened his seat-belt. The passenger was unable to talk to the pilot because he was not familiar with the helmet that was available to him. The survivor reported that the helicopter was in a level, climbing attitude, accelerating in cloud, when things darkened from below. The pilot reacted by pulling back on the cyclic. The survivor felt the impact of the tail skid on the upslope of the ridge just prior to the main impact. As the helicopter rolled down the far side of the ridge, he undid his seatbelt and was thrown clear of the wreckage.

The weather in the immediate area, according to the survivor, was variable with rain, wind, fog, and clear skies. The weather in the general area, as reported by the Arctic Weather Centre, was consistent with the survivor's observations. A heavy rain shower was moving into the area when the helicopter arrived. The survivor later remarked that the sun came out within 15 or 20 minutes after the crash. There was no evidence that any aircraft malfunction contributed to the accident.

The pilot was not instrument rated, nor was the aircraft certified for instrument flight.

*ANALYSIS:*

The pilot lifted off into the cloud base and then attempted to climb out of the valley with no visual reference to the ground. Although the aircraft was equipped for basic instrument flight, it was not certified for, nor was the pilot qualified for, instrument flight operations.

*FINDINGS:*

**Cause Related:**
1. The pilot attempted flight in instrument flight conditions; he was not qualified for, nor was the aircraft certified for, such a flight.

2. While flying in cloud, the helicopter struck a mountain ridge.

**Other:**
-Nil-

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SEALAND HELICOPTERS LTD.
BELL 206L (Helicopter) C-GMHY
CARTWRIGHT, NEWFOUNDLAND
09 AUGUST 1986

REPORT NUMBER: 86-A60030 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1215 ADT
OPERATION: Commercial
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 347 | 347 |
| LAST 90 DAYS | 115 | 115 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*HISTORY OF THE FLIGHT:*

The helicopter was chartered out of Goose Bay, Labrador to ferry sport fishermen between Cartwright Airport and a fishing camp on the Eagle River. The helicopter departed Goose Bay for the fishing camp where two passengers were dropped off and then proceeded to the town of Cartwright to refuel. After take-off, as the helicopter was starting across the harbour, the pilot heard a loud bang, and the helicopter yawed to the left. The pilot thought that the tail rotor was in a fixed pitch failure condition, so he reduced power and airspeed to minimize the yaw. When the airspeed was reduced, the helicopter started to rotate. The pilot managed to direct the rotating helicopter toward the opposite shore of the harbour, where he carried out a forced landing.

*PERTINENT INFORMATION:*

During his pre-flight walkaround prior to departing Goose Bay, the pilot placed the main rotor tie-down in the baggage compartment. Upon arrival in Cartwright, the pilot removed the refuelling equipment from the baggage compartment and refuelled the helicopter. After refuelling, the pilot closed the baggage compartment door and boarded the helicopter without doing a walkaround. After take-off, an observer on the ground saw something hanging from the helicopter as it flew away.

The main rotor tie-down consists of two grey nylon straps attached to a piece of blue, vinyl-covered felt. Both tail rotor blades had blue and greyish-coloured marks on them. One main rotor blade had a greyish-coloured mark near the tip. The tie-down could not be found after the accident. Laboratory analysis of the tail rotor blades and a main rotor tie-down made from the same material concluded that the marks on the blades were made by contact with a material of the same composite as the main rotor tie-down.

There was no place in the helicopter designated for stowing the main rotor tie-down. This is left to the personal preference of each pilot; however, it is usually stowed in either the hat rack or the baggage compartment. When stowed in either of these positions, the pilot cannot verify from the cockpit that it is secured.

A section of the tail rotor drive shaft was sheared. The pilot indicated that, after the helicopter yawed to the left, there was no response to tail rotor pedal movement. According to the Bell 206L Flight Manual, when a complete loss of tail rotor thrust occurs, the pilot should enter autorotation immediately. However, if a suitable landing site is not available, the large ventral fin may permit controlled flight at reduced power levels and sufficient airspeed.

*ANALYSIS:*

When the refuelling equipment was removed, the main rotor tie-down was inadvertently pulled out of the baggage compartment, and it draped over the skid tube. Once the refuelling operation was completed, the pilot boarded the helicopter without doing a thorough walkaround. When the helicopter took off, the tie-down hanging from the skid tube flew up into the main rotor which carried it into the tail rotor. This caused a sudden stoppage of the tail rotor, which sheared the tail rotor drive shaft and resulted in a complete loss of tail rotor thrust.

Had the pilot carried out a thorough walkaround or had the colour of the tie-down been more conspicuous, he probably would have noticed that the tie-down was draped over the skid tube. If there had been a designated place, visible from the cockpit, for stowing the tie-down, the pilot would have noticed that it was not secured.

Had the pilot diagnosed the tail rotor failure as a complete loss of thrust instead of a fixed pitch failure, he could have prevented the helicopter from rotating. However, he did manage to carry out a successful autorotation, with minimal damage to the helicopter.

The following laboratory report was completed: LP 175/86 - Tail Rotor/Main Rotor Bell 206L GMHY.

*FINDINGS:*

**Cause Related:**

1. The pilot did not carry out a thorough walkaround prior to boarding the helicopter and, consequently, took off with the tie-down draped over the skid tube.

2. A complete loss of tail rotor thrust occurred when the tail rotor drive shaft sheared as a result of the main rotor tie-down striking the tail rotor.

**Other:**

1. The main rotor tie-down was an inconspicuous colour.

2. There was no place in the helicopter designated for stowing the main rotor tie-down.

ROTOFLITE
BELL 206L1 (Helicopter) C-GBHQ
STONY RAPIDS, SASKATCHEWAN 3 mi S
10 AUGUST 1986

BRIEF NUMBER: 86-C60077 (Accident)
LOCAL TIME: 1918 CDT
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,057 | 275 |
| LAST 90 DAYS | 198 | 59 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

***REPORTED CIRCUMSTANCES:***

The pilot was returning to his base of operations when he saw what he believed to be a bear or other animal. He descended to investigate and turned through 360 degrees at low altitude. He then continued on course but did not climb immediately to cruise altitude. While concentrating on a power line to his right, he failed to see a telephone line perpendicular to his flight path. The helicopter struck the wire but remained airborne. The pilot assessed the situation and decided to continue to the airfield which was a short distance away. After the landing, an inspection of the aircraft revealed damage to the pitch rods, drive link, and tail boom.

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TOTEM AIR LTD.
BELL 206 (Helicopter) C-GBZL
HIGH PRAIRIE AIRPORT, ALBERTA
13 August 1986

BRIEF NUMBER: 86-W60045 (Accident)
LOCAL TIME: 0855 MDT
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 300 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot departed the terminal parking area on a short fight to the forestry helipad for fuel. The helicopter was passing over the centre of the airfield at a height of 50 feet and at 10 to 15 mph airspeed, when the engine-out horn and light came on, and the engine lost all power. The pilot made an autorotative landing, but the helicopter landed hard, and the tail boom and skids were damaged.

The aircraft lost power because of lack of fuel. The aircraft manufacturer's handbook indicates that a successful autorotation from 50 feet at 15 mph is not possible without damaging the helicopter.

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ASSOCIATED HELICOPTERS CO. LTD.
AEROSPATIALE AS350B ASTAR (Helicopter)
C-GAHI
CHIPEWYAN LAKES, ALBERTA
20 AUGUST 1986

BRIEF NUMBER: 86-W60048 (Accident)
LOCAL TIME: 0930 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,498 | 221 |
| LAST 90 DAYS | 95 | 95 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was attempting to place a sling load on a loading dock beside a metal building. The main rotor blades struck the roof of the building, and the helicopter fell to the ground and rolled onto its left side. The wind was calm at the time of the accident.

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WOODLAND HELICOPTERS LTD.
BELL 206B (Helicopter) C-GLDS
CRESTON, BRITISH COLUMBIA 30 mi NE
21 AUGUST 1986

BRIEF NUMBER: 86-P60047 (Accident)
LOCAL TIME: 1220 PDT
OPERATION: Specialty Aerial Control
DAMAGE: Destroyed
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,938 | 2,788 |
| LAST 90 DAYS | 180 | 180 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

During lift-off from a temporary mountainside pad, the helicopter rolled over onto its left side. The main rotor blades struck the fuselage, and the helicopter caught fire.

There was a large bladder-type water reservoir at the site, positioned such that, when the helicopter landed, it was necessary to nestle its nose against the water bladder. The water bladder was encased in a webbing of straps. One of these straps caught on the left skid of the helicopter when it landed and caused the helicopter to roll over on take-off.

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UNION HELICOPTERS LTD.
SIKORSKY S-58 (Helicopter) C-GUNI
WASKESIU, SASKATCHEWAN 10 mi W
28 AUGUST 1986

BRIEF NUMBER: 86-C60089 (Accident)
LOCAL TIME: 1800 CST
OPERATION: Specialty Aerial Control
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 8,000 | 2,000 |
| LAST 90 DAYS | 200 | 200 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The helicopter was on a fire suppression operation using a water bucket. On the first attempted drop, the bucket doors did not open, and the aircraft began to sink. While the pilot was attempting to manoeuvre away from the fireline, the bucket struck some trees, and the aircraft settled to the ground. It was not determined why the bucket doors failed to function properly.

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CALEDON HELICOPTERS LIMITED
BELL 47G-4 (Helicopter) C-FVPA
SISSIBOO FALLS, NOVA SCOTIA
01 SEPTEMBER 1986

BRIEF NUMBER: 86-A60033 (Accident)
LOCAL TIME: 1300 ADT
OPERATION: Specialty Aerial Application
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,100 | 600 |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The helicopter was being used to spray herbicide in a forested area. The pilot flew a short spray flight, and, during the return flight to the landing site, the engine stopped. The aircraft was very low over the trees. The pilot initiated autorotation and executed a 270-degree turn to land on a road. During the turn, rotor rpm decreased, and the pilot attempted a run-on landing on the road. The aircraft landed hard, resulting in the main rotor striking and severing the tail boom.

Prior to the accident flight, the helicopter had been parked in a nose-down and left-side-low attitude, which allowed fuel from the right tank to flow to the left tank. Before take-off, the pilot checked the fuel level in the left tank only. The amount of fuel in the left tank led the pilot to believe that there was more fuel in the fuel tanks than was actually available. The engine stopped because of fuel starvation.

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## BELL LONGRANGER B206L-1 (Helicopter) C-GMNW EDMUNSTON, NEW BRUNSWICK 26 JULY 1986

BRIEF NUMBER: 86-A60026 (Accident)
LOCAL TIME: 1640 ADT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6,000 | 3,000 |
| LAST 90 DAYS | 91 | 91 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

The pilot under training was practising an autorotational landing, and helicopter touched down on the heel of the skids, in a nose-up attitude with aft cyclic and low main rotor rpm. It then pitched forward, raising the tail boom; the main rotor blade struck the top of the vertical stabilizer. The instructor pilot took control immediately but was unable to prevent the main rotor strike.

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## ULTRALIGHT LAZAIR (Ultralight) C-IAKK MURILLO, ONTARIO 12 mi W 11 JANUARY 1986

REPORT NUMBER: 86-C65001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1733 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: No Licence or Permit on File

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The ultralight aircraft took off from a short, snow-covered grass strip. Shortly after becoming airborne, it turned sharply, descended from an altitude of about 20 feet above ground level, and struck the ground. The aircraft was substantially damaged, and the pilot was seriously injured.

The weather was suitable for ultralight operations, and the wind was calm. The relatively inexperienced pilot had just landed for a five-minute stop, and the aircraft had functioned normally in all respects. Another pilot who had flown the aircraft earlier reported that there was some engine roughness, and, on landing, he had found ice in the carburettor. The pilot of a similar ultralight being flown with the occurrence aircraft did not report carburettor icing.

No fault was found with the engines, and it is not known if carburettor icing was a factor. The other ultralight, which was of similar make and configuration, had taken off from the strip just minutes before without difficulty. The engines appeared to develop full power during take-off, but the controls felt "mushy" to the pilot. The aircraft climbed to 10 feet, levelled, climbed to 20 feet, levelled, then climbed again before stalling for undetermined reasons.

***FINDINGS:***

**Cause Related:**
1. Shortly after becoming airborne, the ultralight aircraft stalled for undetermined reasons.

**Other:**
-Nil-

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## COMET A (Ultralight) C-IHTR WILLIAMS LAKE, BRITISH COLUMBIA 29 JANUARY 1986

REPORT NUMBER: 86-P65001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1620 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | Unknown | 50 |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The ultralight aircraft, which was designed and built by the pilot, had flown about 20 minutes before a witness reported hearing a sound similar to wood splintering and breaking. Another witness reported seeing two separate objects fall to the ice. These were determined to be the right wing and the remainder of the ultralight. The ultralight struck the ice nose first, and the engine was pushed back into the cockpit area. The pilot was fatally injured in the crash.

The forward section of each wing was constructed with a wooden skin of one-eighth inch plywood which was butted together and glued to a stringer at the leading edge in an area of maximum wing curvature. The joint was sanded to a smooth finish, thus reducing skin thickness in this area. The bending of the plywood around the wing's leading edge created delaminating forces within the plywood which caused the plywood to separate from the stringer and enabled dynamic air forces to strip the styrofoam formers from the wing's leading edge. When wing integrity was destroyed in the area of initial failure, normal aerodynamic forces resulted in complete failure of the right wing.

The wing skin construction was designed and assembled by the pilot. The design and method of construction were inadequate to meet normal aerodynamic loads encountered during flight over a period of time. Canadian regulations do not require ultralight aircraft to meet Canadian airworthiness standards.

*FINDINGS:*

**Cause Related:**

1. The wing design and method of construction were inadequate to meet normal aerodynamic loads encountered during flight.

2. The right wing leading edge of the ultralight delaminated in flight and destroyed the wing integrity.

**Other:**

1. Canadian regulations do not require ultralight aircraft to meet Canadian airworthiness standards.

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## LAZAIR ELITE (Ultralight) C-IJPX
## SURREY, BRITISH COLUMBIA
## 16 MARCH 1986

REPORT NUMBER: 86-P65002 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1530 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 758 | 758 |
| LAST 90 DAYS | .6 | .6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

Following take-off, the ultralight was in a left-hand climbing turn, 50 feet above the ground, when the right engine (KFM-25HP) stopped. The aircraft rolled right into a nearly inverted attitude and struck the ground nose-down. The pilot sustained serious injuries and could not remember what had happened after the engine had stopped.

Twenty-five horsepower (hp) engines had recently been installed on the aircraft to replace nine hp engines, and the 25 hp right engine had just been reinstalled following a major overhaul. A break-in period of approximately 40 minutes had been completed when the pilot decided to fly the aircraft. The engine manufacturer recommends that a "new engine undergo light load operations by the operator for the first four to five hours of use." The manufacturer further recommends that the fuel system, having a vertical distance of more than 27 inches from the bottom of the tank to the carburettor inlet, be augmented by a second fuel pump. The measured distance between the carburettor inlet and the fuel tank outlet was 36 inches; however, a second fuel pump had not been installed as recommended. The engine stopped because of fuel starvation.

The pilot had flown the Lazair with the nine hp engines installed for several hundred hours; his experience with the higher hp engine was limited to two flights. The effect on aircraft controllability with the more powerful engines installed was not determined. When the right engine lost power, the pilot lost control of the aircraft.

*FINDINGS:*

**Cause Related:**
1. The second fuel pump was not installed as recommended by the engine manufacturer, and, as a result, the right engine stopped because of fuel starvation.

2. Following the power loss, the pilot lost control of the aircraft.

**Other:**
1. The engine manufacturer's break-in period of four to five hours was not complied with.

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ULTRAVIA AERO PELICAN CLUB (Ultralight)
C-ICCT
FORT MCMURRAY, ALBERTA
19 MARCH 1986

REPORT NUMBER: 86-W65001 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1130 MST
OPERATION: Private Other
DAMAGE: Substantial
PILOT LICENCE: Ultralight Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,800 | 22 |
| LAST 90 DAYS | 40 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The ultralight aircraft was being flown on a dual demonstration flight from an ice strip on a river. Just prior to lift-off, the aircraft struck a trench which had been worn in the ice by motorcycles. The right wheel broke off; the aircraft bounced into the air, turned 90 degrees, and landed in rough ice at the edge of the strip where it slid to a stop.

The pilot had not checked the ice strip prior to taking off and was unaware of the deterioration of the surface caused by motorcycles crossing over the strip.

*FINDINGS:*

**Cause Related:**
1. The pilot did not check the strip for obstructions prior to take-off.

2. The pilot lost control of the aircraft when it struck a trench and the right wheel broke off.

**Other:**
-Nil-

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CHINOOK WT-II (Ultralight) C-IBWN
MELFORT, SASKATCHEWAN 13 mi NW
25 MARCH 1986

REPORT NUMBER: 86-C65002 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0830 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 40 | 35 |
| LAST 90 DAYS | .5 | .5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot departed from a field by his home for an aerial inspection of a nearby farm property that he was considering buying. He flew several lengthwise passes over the north/south half-section, at an estimated height of 100 feet above ground level (agl), and last recalled proceeding northbound at approximately mid-field. He estimated that he had been airborne for 20 minutes at that time. The aircraft wreckage and unconscious pilot were discovered almost two hours later, 28 feet beyond the north edge of the field.

The aircraft, on a southerly heading, struck the ground in a steep, nose-down, slightly right-wing-low attitude. The ballistic parachute had not been deployed. Wreckage examination revealed no evidence of pre-impact mechanical or structural failure; damage and ground scars were consistent with a stall at very low altitude. Ground impact occurred 28 feet north of a single-strand power line and 85 feet northwest of a power pole. No evidence of a wire or pole strike was found.

At the time of the occurrence, the ground had a thin snow cover. Reportedly, local weather at the time of departure was overcast with good visibility, and the wind was northerly at about 10 knots. Residents of Melfort stated that snow was falling there by 0830 CST and described conditions as "blustery." The pilot stated that

he did not encounter snow as he overflew the field and that the wind remained steady. He did not recall any details of the crash sequence.

Canadian Regulations state that the holder of a Student Pilot Permit may act as a pilot-in-command of an ultralight aeroplane provided that he is under the supervision and direction of the holder of an Ultralight Aeroplane Commercial Pilot Licence. This flight was not conducted under the supervision and direction of a qualified pilot.

The cause of the loss of control could not be determined; however, the aircraft stalled at a low altitude from which recovery was not possible. This may have occurred when the pilot sighted and attempted to avoid a power line near the crash site. During low-level manoeuvres over a snow-covered field in overcast conditions, a pilot could have difficulty either visually assessing aircraft height above ground or recognizing a gradual descent. Unless the pilot consciously noted the location of the power poles as a reference for obstacle clearance, it is unlikely he would have detected the single line until the aircraft was very close to it. A good deal of the pilot's attention probably was focused upon the land he was surveying, rather than on the conduct of the flight.

*FINDINGS:*

**Cause Related:**
1. For undetermined reasons, the pilot stalled the aircraft at an altitude that precluded recovery prior to ground contact.

**Other:**
1. The student pilot conducted a flight, although he was not under the supervision and direction of an Ultralight Aeroplane Commercial Pilot Licence holder.

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## SPECTRUM BEAVER (Ultralight) C-IEJO
## CHINOOK, ALBERTA 6 mi S
## 04 APRIL 1986

REPORT NUMBER: 86-W65003 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0715 MST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 9 | 9 |
| LAST 90 DAYS | 9 | 9 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | - |

*SUMMARY REPORT:*

Ten minutes after take-off, at about 500 feet above ground level, the left aileron control cable of the newly constructed ultralight became disconnected. The pilot was unable to maintain roll control with rudder, and the aircraft entered a spiral dive. The aircraft struck a power line, stretched the cable to the ground, and came to rest hanging from the line. The pilot, although seriously injured, was able to release his seat-belt and that of his unconscious passenger. They dropped several feet to the ground and, unable to move, remained there until rescued six hours later.

A grass fire, ignited by arcing from the power line through the aircraft, began about two hours after the accident. The survivors were able to save themselves by smothering the flames around them.

Examination of the wreckage revealed that the left aileron balance cable was disconnected at the centre section link. The clevis pin and safety pin that join this connection were not found at the accident site. The safety pin, that secures the clevis pin, was probably omitted during construction, thus allowing the clevis pin to fall out in flight. Correct assembly would have prevented the disconnection. Control of the aircraft is not possible without the use of ailerons.

Although the pilot had received the prescribed training, he was not licensed to act as pilot-in-command or to carry passengers. The aircraft did not display nationality or registration marks, nor a data plate as required by the Air Regulations.

***FINDINGS:***

**Cause Related:**
1. Aileron control was lost when a clevis in the aileron control cable circuit became disconnected.

**Other:**
1. The pilot was not licensed to act as pilot-in-command or to carry passengers.

2. The aircraft was not registered and displayed no marks or data plate.

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TEENIE TWO (Amateur-Built) C-GZZY
BORDEN AIRPORT, ONTARIO
14 APRIL 1986

REPORT NUMBER: 86-O/60021 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1835 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 149 | 29 |
| LAST 90 DAYS | 4 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

While on close final approach, and at the normal approach speed, the aircraft began to settle rapidly. The pilot applied full throttle but was unable to check the descent before the aircraft touched down heavily, short of the runway.

The restricted area adjacent to the airport requires the base leg to be flown close to the runway; the turn to final is therefore at a lower altitude than normal. The lower than normal base leg was flown over the upwind edge of an area of trees, and this may have resulted in the initial descent being carried out in an area of updrafts. Once the aircraft turned final, it would have flown out of the area of updrafts and would therefore have descended more rapidly.

The wind is not recorded at Borden Airport. It may have been stronger than the pilot's estimate of seven knots. The application of power did not decrease the rate of descent sufficiently before the aircraft touched down.

***FINDINGS:***

**Cause Related:**
1. The base leg and final turn were carried out at a lower altitude than normal due to a restricted area adjacent to the airport.

2. For reasons not determined, the rate of descent on final increased rapidly, and the aircraft touched down heavily, short of the runway.

**Other:**
-Nil-

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BEACH BOY (Ultralight) C-ICIL
ST. ANDREWS AIRPORT, MANITOBA
21 APRIL 1986

REPORT NUMBER: 86-C65003 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1210 CST
OPERATION: Private Testing
DAMAGE: Destroyed
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 600 | 1 |
| LAST 90 DAYS | 10 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was conducting the inaugural flight in his prototype ultralight aircraft. On the downwind leg, he advised the tower that he was experiencing control difficulties, and, shortly thereafter, the aircraft rolled abruptly right and descended rapidly until ground impact.

The pilot suffered a complete memory loss with respect to the circumstances of this accident and was unable to provide any details.

The weather conditions were ideal for ultralight flying. Skies were clear, and the winds were almost calm.

The pilot conducted taxi tests prior to requesting departure clearance. The take-off appeared normal, but the cross-wind turn was noticeably flat. When he was downwind, the pilot transmitted that he would be making a full-stop landing because he was having control difficulties. At the base leg turn, the aircraft was seen to yaw, then roll sharply to the right.

During construction, an ineffective clamping method had been used to secure the wing-mounted aileron push-pull flex cables. The outer casing of the cable was secured at the wing root using a notched clamp and wood screw arrangement. The flex cable diameter was such that the clamp flanges did not reach the surface of the wooden mounting block. Further, the clamp assembly and cable housing were secured by only two small screws inserted just over one-half inch into the block. The clamp for the inboard cable casing was found loose inside the left wing, and the securing notch showed signs of metal pick-up.

The fore and aft wing spars were attached to the spar carry-through structure by three-eighth-inch diameter bolts. In at least three of the eight spars, the attachment hole was drilled within an inch or less of the end of the wing spar. There was no evidence to suggest that failure of these attachments was related to the accident.

The aircraft was equipped with an armed ballistic parachute device. The parachute is designed to be manually deployed in emergency situations such as complete loss of control. The device had not been activated.

The unsecured clamp flanges permitted the clamp and cable casing to move back and forth with aileron control input. This movement loosened the screws, then pulled them from the mounting block. The metal pick-up noted on the clamp notch further supports progressive loosening or improper alignment at installation. Improper alignment would mean even less penetration of the screws into the wooden mounting block.

The freed outer case of the left aileron flex cable would produce a downward deflection of the left aileron. This movement would be somewhat reduced by aerodynamic forces at normal speeds, although the pilot would recognize a severe aileron imbalance. Any reduction in airspeed would upset this balance, and the aircraft would yaw and roll right in an uncontrollable manner.

Due to the pilot's loss of memory, it could not be determined why the ballistic parachute device was not activated.

The spar attachment holes should have been drilled at a distance greater than one inch from the end of the spar. While this did not contribute to the accident, greater inboard distances would have provided a more secure attachment.

***FINDINGS:***

**Cause Related:**
1. The left aileron push-pull flex cable was inadequately secured.

2. The cable clamp pulled free in flight, resulting in the downward deflection of the left aileron and the subsequent loss of aircraft control.

3. The ballistic parachute device was not deployed.

**Other:**
1. The spar attachment holes were drilled too close to the end of the spar.

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## TERRY MINI CAB HAWK (Amateur-built) C-FABO
## TORONTO/MARKHAM AIRPORT, ONTARIO
## 23 APRIL 1986

REPORT NUMBER: 86-O/60024 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1115 EST
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 400 |
| LAST 90 DAYS | 1 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

While carrying out a high speed taxi test, the pilot could not maintain directional control, and the aircraft inadvertently became airborne.

The pilot reduced power immediately to land, but the aircraft drifted off the left side of the runway. The aircraft touched down in the soft muddy ground beside the runway and nosed over.

The taxi test was attempted on runway 09. The surface wind was from 340 degrees at 12 knots gusting to 18. The combined cross-wind and tail wind components

were determined to be beyond the capability of the tail-wheel-equipped aircraft.

*FINDINGS:*

**Cause Related:**
1. The high speed taxi test was attempted in wind conditions which exceeded the aircraft's capability, and the pilot could not maintain directional control.

2. The aircraft drifted off the runway after becoming airborne and nosed over when it was landed in the soft mud beside the runway.

**Other:**
-Nil-

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BEAVER RX-550 (Ultralight) C-IGQR
BALDWIN, ONTARIO 1 mi W
25 APRIL 1986

REPORT NUMBER: 86-O/65001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1030 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 68 | 46 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The aircraft was observed by witnesses at about 1030 eastern standard time (EST) flying at a height of approximately 500 feet in a northerly direction. The aircraft was flying straight and level, then suddenly went into a steep nose-down attitude, and disappeared behind some trees. A short time later, the aircraft came back into sight but was flying in an inverted, nose-up attitude. The aircraft climbed to a height of approximately 250 feet while in the inverted attitude, then pitched nose-down, and disappeared from sight once again behind the trees. Shortly after, witnesses heard a loud bang.

The aircraft crashed into a large, open, ploughed field which is used for sod farming. The ground impact marks indicated an impact angle of approximately 67 degrees in an inverted, wings-level attitude. The pilot was fatally injured.

The Toronto 1500 Coordinated Universal Time (1000 EST) weather was reported as thin broken cloud at 12,000 feet, visibility 12 miles, temperature +18 degrees Celsius, dew point 3 degrees Celsius, winds 110 degrees at two knots and an altimeter setting of 30.05 inches of mercury.

Examination of the wreckage did not reveal any evidence of a pre-impact malfunction of the flight controls or pre-impact structural failure.

The pilot was described by his peers as a cautious aviator who would not perform abrupt flight manoeuvres, or attempt any kind of aerobatic manoeuvres. He had been in good health, until approximately 12 years ago when he developed episodes of atrial fibrillation. This condition had been kept under control by the use of medication. A post-mortem examination did not reveal any cause of possible incapacitation.

The local area and weather conditions were ideal for ultralight flying. It would appear that the flight manoeuvres observed by the witnesses were the result of flight control inputs by the pilot; whether they were voluntary or involuntary could not be determined.

The following laboratory report was completed: LP 106/86 - Instrument Analysis.

*FINDINGS:*

**Cause Related:**
1. The cause of the accident was not determined.

**Other:**
-Nil-

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## ULTRAFLIGHT LAZAIR (Ultralight) C-IBBR WOLLASTON LAKE, SASKATCHEWAN 40 mi SW 06 MAY 1986

REPORT NUMBER: 86-C65005 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1045 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: None

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2 | 0 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The ultralight pilot set course on a 128 nautical mile cross-country flight over a sparsely settled area. Approximately 30 minutes after take-off, at a height of about 500 feet above tree level, the ultralight stalled and struck the ice-covered surface of a lake. The injured pilot, who remained inside the wreckage, was rescued 26 hours later. His wife had contacted authorities after the estimated time of arrival at destination had lapsed.

The pilot was not licensed and had received no flying training. He had previously flown an ultralight for two hours, and this was to be his first flight in his aircraft. The pilot indicated that he did not properly manage the power setting and the indicated airspeed. As a result, the airspeed decayed until the aircraft stalled, and the pilot did not know how to recover.

The pilot was appropriately dressed for the climatic conditions and was unaffected by the cold temperatures while awaiting rescue.

***FINDINGS:***

**Cause Related:**
1. The pilot attempted to fly his ultralight although he had no experience and had received no flying training.

2. The pilot did not manage the power setting and the indicated airspeed, and, as a result, the aircraft stalled.

3. The pilot did not know how to recover from a stall, and the aircraft struck the ice-covered surface of a lake.

**Other:**
1. The pilot was not licensed.

2. The injured pilot wore adequate clothing and was not adversely affected by the cold temperatures prior to rescue.



## BIRDMAN CHINOOK WT 11 (Ultralight) C-IBOU KLONDIKE RIVER LODGE - DEMPSTER HIGHWAY, YUKON 10 MAY 1986

BRIEF NUMBER: 86-W65005 (Accident)
LOCAL TIME: 1200 YST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: None

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20 | 20 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The self-taught pilot was flying his aircraft to his home base and decided to land en route on a highway to refuel. While he was circling the selected landing area, he allowed the airspeed to decay. The aircraft descended in a spiral turn into some trees.



## TERATORN TIERRA II (Ultralight) C-IFKD ST. LEON DE CHICOUTIMI, QUEBEC 14 mi N 26 MAY 1986

BRIEF NUMBER: 86-Q65006 (Accident)
LOCAL TIME: 2000 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 35 | 35 |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

***REPORTED CIRCUMSTANCES:***

Shortly after take-off, at an altitude of 150 to 200 feet, the aircraft began losing speed and altitude. Although the airspeed indicator still read 45 miles per hour, the pilot was unable to maintain a positive rate of climb, and he made a hard, involuntary landing on the water. The right forward float brace perforated the float. With full power, the pilot taxied to the shoreline, and when he reduced the power to idle, the damaged float sank, and the aircraft nosed over.

The take-off path was a narrow stretch of water providing a take-off run in excess of 3,000 feet. It was predominantly oriented northeast/southwest, running parallel and downwind of a row of small hills. The aircraft was subject to a downdraft generated by a 10-knot wind blowing from the left over the hills.

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BURKHART GROB, GROB G102 STANDARD III (Glider) C-GFRL
BELWOOD, ONTARIO 5 mi W
01 JUNE 1986

REPORT NUMBER: 86-O/60042 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1500 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Glider

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 425 | 10 |
| LAST 90 DAYS | 6 | - |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

On Sunday morning, several glider pilots got together at the Belwood Air Sailing Club for a day of soaring. At approximately 1430 eastern daylight time (EDT) after several hours of flying, it was decided to put the gliders away because the deteriorating weather conditions were not conducive to good soaring. The last glider to be towed aloft was C-GFRL. As the tow pilot positioned the tow aircraft for this last tow, the owner of the glider offered one of the other pilots the opportunity to fly his glider. The pilot had not flown this aircraft in the previous 90 days. The tow was to the west into wind and consisted of a climbing left turn which brought the two aircraft over the southwest end of the field heading in a southeasterly direction at an altitude of about 600 feet above ground level (agl). The glider was released over the airport. After separation, the tow aircraft continued straight ahead for approximately one-quarter mile before beginning a descending right turn to land on runway 05. The intention was to land as quickly as possible so as to leave the runway clear for the glider.

When the glider pilot released the glider from the tow plane, his intention was to complete a 270-degree right turn which would line him up on final for runway 05. He deviated from this plan, however, when he observed that the tow plane was already in a descending right turn. The separation between the two aircraft was estimated to be about 100 feet vertical, and, though he was not concerned about colliding with the tow plane, the glider pilot chose to continue farther to the south before beginning his turn. The turn was to the left which was downwind, rather than to the right as had been originally planned. When the turn was completed, the pilot was surprised to see how far to the south and east he had drifted, and that he had lost 150 feet in the turn.

Although he was farther out and lower than expected, the pilot felt that he could still make it back to the airfield. As he neared the airfield, the pilot saw hydro poles and was aware that there were wires across his flight path, even though he did not see them. Although the approach was much lower than normal, the glider's airspeed was 80 knots which he felt would be adequate to carry it over the wires and onto the airfield.

The aircraft struck the wires as the pilot was about to ease back on the control column to clear them. Initial contact with the wires was made by the aircraft canopy, which broke on contact. The aircraft then crashed beside a small creek about 800 to 1,000 feet short of the airport.

At the time of the accident, a cold front was passing over the area. The cloud base was estimated at 800 feet agl, and there were scattered light rain showers in the area. The winds were between 300 degrees and 340 degrees at 7 to 10 knots.

The pilot, who was not current on this type of aircraft and had not planned to fly that day, did not have a personal briefing with the tow pilot. Therefore, he was not aware of the tow pilot's intention of making a quick right turn after the release.

The glider pilot's change in the planned flight resulted in a flight path which took him farther from the airstrip and during which he lost more altitude than had been expected. The loss of altitude during the turn may have been due to unfamiliarity with the aircraft or due to the prevailing meteorological conditions, or due to a combination of both. The result, however, was that the

aircraft ended up at the same level as the wires, and the pilot did not pull up in time to avoid them.

*FINDINGS:*

**Cause Related:**
1. Prior to the flight, the pilots did not brief about their respective flight paths after separation.

2. Assuming the tow pilot would turn left, the pilot of the glider, while at a low altitude, deviated from his original flight plan and turned away from the airport rather than towards it.

3. The glider was low on final approach to the airport because of the altitude lost in the turn and the distance it had drifted away from the airport.

4. The pilot did not see the hydro wires in time to avoid them.

**Other:**
-Nil-

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SPECTRUM BEAVER RX 550 (Ultralight) C-IBPH
MEADOW LAKE, SASKATCHEWAN 3 mi NE
07 JUNE 1986

REPORT NUMBER: 86-C65006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1910 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: None

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot departed from the Meadow Lake Golf Course for a short flight to a private airstrip 3.5 miles northwest of town. On arrival, the aircraft completed at least two circuits of the airstrip at an altitude of 300 to 500 feet. The aircraft then suddenly descended rapidly and crashed in an inverted position onto a field one quarter mile short of the airstrip. The pilot received fatal injuries.

The aluminum wing tip compression strut on the right wing had been damaged in a previous, unreported landing accident. The pilot had replaced this strut with a wooden one he had manufactured from a piece of one-by-two spruce of poor quality. During flight, the wooden strut failed in compression, allowing the two right wing spars to move together approximately 1.5 inches, which allowed the wing fabric to billow.

The ballistic parachute was found deactivated. The release pins had been removed and replaced with three-inch nails while the aircraft was on display during a sidewalk sale.

The pilot had received 5.5 hours training on Chinook ultralight aircraft and then failed to pass his solo check-ride. There is no evidence that he took further flying training. It is not known how many hours he flew in the accident aircraft.

The billowing of the right wing fabric increased the lift produced by that wing. The asymmetric lift between the left and right wings caused the aircraft to enter an uncontrollable roll to the left. The pilot was unable to deploy the ballistic parachute because it had been deactivated; nor was he able to regain control prior to ground impact.

*FINDINGS:*

**Cause Related:**
1. The pilot replaced the aluminum right wing compression strut with a wooden strut which failed in compression during flight.

2. The failure of the wing tip strut allowed asymmetric lift to be produced by the wings, causing the aircraft to enter an uncontrollable roll to the left.

3. The pilot was unable to deploy the ballistic parachute because it had been deactivated.

**Other:**
-Nil-

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## CHINOOK 2S (Ultralight) C-IEBF
## KILLAM, ALBERTA
## 13 JULY 1986

REPORT NUMBER: 86-W65007 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0930 MDT
OPERATION: Private Aerial Spray
DAMAGE: Substantial
PILOT LICENCE: Private Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 133 | 130 |
| LAST 90 DAYS | 36 | 36 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot was using the spray-gear-equipped ultralight for the aerial application of chemicals to his field. While in a turn at the end of a spray run, the aircraft began to lose altitude and then struck the ground. The pilot received two broken ankles in the mishap.

The accident occurred on the second day of spray operations, using an ultralight aircraft, and on the first run of the second load of chemical. The pilot had no previous experience with aerial applications. Weather conditions were suitable for the operation and not considered a factor in the accident.

The spray gear installation was purchased and installed by the owner. The gear, weighing approximately 40 pounds, was attached to the rear spar of the wing, placing the loaded aircraft's centre of gravity beyond the aft centre of gravity limit.

The centre of gravity outside the aft limit adversely affected the aircraft's longitudinal stability to the extent that control was lost in the turn. The lack of substantial structure in the cockpit area contributed to the injuries received by the pilot.

*FINDINGS:*

**Cause Related:**
1. Because of the inappropriate installation of the spray equipment, the aircraft was being flown with a centre of gravity outside the prescribed limits, which caused a loss of control.

**Other:**
-Nil-

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## TERRATORN TIERRA II (Ultralight) C-ICNQ
## PRINCE ALBERT, SASKATCHEWAN
## 15 JUNE 1986

BRIEF NUMBER: 86-C65007 (Accident)
LOCAL TIME: 1530 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 34 | 34 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot was flying over the Saskatchewan River when the engine (Rotex 503) lost all power. The pilot elected to force-land in the river, and the aircraft overturned after the wheels hit the water, causing substantial damage.

One piston of the two-cylinder engine failed for undetermined reasons.

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## CUBBY II (Ultralight) C-IEHJ
## HALBRITE, SASKATCHEWAN 2 mi NW
## 18 JUNE 1986

BRIEF NUMBER: 86-C65008 (Accident)
LOCAL TIME: 0600 CST
OPERATION: Private Aerial Spray
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 382 | 38 |
| LAST 90 DAYS | 45 | 38 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot was conducting crop-spraying operations in a southeast/northwest direction. The wind was from the east at about five mph. On the fourth east-to-west run, the left wing tip struck a power line which ran diagonally across the flight path at the west end of the field. The impact caused the aircraft to pitch down and strike the ground before the pilot could recover.

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BIRDMAN CHINOOK 2S (Ultralight) C-IGHM
PENFOLD LAKE, ONTARIO
21 JUNE 1986

REPORT NUMBER: 86-O/65003 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1930 EDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Student Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10 | - |
| LAST 90 DAYS | - | - |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The student pilot had just purchased the ultralight aircraft and was practising high-speed taxi runs on the lake in front of his house. Early in the afternoon, the pilot had experienced some lateral control problems with the aircraft and found that the right float had a substantial quantity of water in it. The source of the water leak was assumed to be the threaded caps on the inspection ports, which were difficult to install without cross-threading. The floats were emptied of the water, and the aircraft was left parked on a ramp with the heels of the floats out of the water. After a couple of hours, the pilot checked the rear compartment of the right float and found it dry. He then pushed the aircraft back into the water for additional taxi tests.

After several high-speed taxi runs, the aircraft became airborne. Once airborne, the pilot decided to do a complete circuit rather than land straight ahead. After the aircraft had been established in the climbing attitude for several seconds, the pilot found that he had to maintain full left aileron to keep the wings level and that full-down elevator would not bring the aircraft's nose down. Because of the lack of control, he elected to force-land the aircraft into trees. The aircraft was substantially damaged; however, the pilot was uninjured.

Examination of the aircraft by the pilot on the following day revealed a quantity of water in the right float. The water quantity was estimated to be 50 pounds. Close examination of the float showed a hair-line crack along the front seam, where the top of the float is bonded to the bottom, which allowed water to leak into the float. Examination of the left float, which had broken in half on impact, showed the seam to be an inside lap joint, which was not evenly bonded along the length of the float. The inside join of the two halves of the float results in a very smooth and attractive exterior finish; however, there is no apparent method of determining the quality of the bond between the two halves of the float.

The float was constructed with interior baffles, whose primary function is to add to the strength of the float. These baffles do not divide the float into isolated chambers; there is a one-to-two-inch gap along the keel of the float for water to run under the baffle. The floats were originally designed without the inspection ports, and the only drain was at the heel of the float. To drain the floats, a plug must be removed and the floats tipped back to allow the water to run out.

When the aircraft was rotated to a nose-high climbing attitude, the water in the float ran to the back of the float. As a result, the centre of gravity of the aircraft was moved back to the point where the aircraft was no longer controllable.

***FINDINGS:***

**Cause Related:**
1. A hair-line crack in the front seam of the right float allowed water to leak into the float.

2. With the water at the back of the float, the aircraft's centre of gravity was far enough aft that the aircraft was no longer controllable.

3. The pilot intentionally force-landed the aircraft in trees.

**Other:**
1. The floats are constructed with baffles which leave a one-to-two-inch gap along the keel. Water is able to run under the baffles either fore or aft, dependent on the attitude of the float.

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## BEDE BD-5-B (Amateur-built) C-GTDD SASKATOON AIRPORT, SASKATCHEWAN 21 JUNE 1986

REPORT NUMBER: 86-C60052 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0757 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,100 | 38 |
| LAST 90 DAYS | 13 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The aircraft had taken off and was climbing away when the propeller, Vari-Prop VC-1-5A-46-PL, oversped; this was followed by severe vibration. The pilot reduced the power, declared an emergency, and the aircraft was cleared to land on the nearest runway. The aircraft did not have sufficient altitude to reach the airport, and the pilot carried out a forced landing in a field, during which the landing gear collapsed.

The propeller was examined after the accident, and one blade was found to be in negative pitch; this blade had shifted on the blade shank quadrant gear. The gear is retained in the blade shank by Lock-Tite adhesive and two set screws, but the set screws had not penetrated the threaded hole in the quadrant gear of either blade.

The hydraulic line to the propeller pitch change actuator was found to be separated from the fitting on the hydraulic actuator. The line had been installed with insufficient flare, causing it to be pushed out by hydraulic pressure.

The aircraft engine produces 110 horsepower at 5800 rpm with a propeller speed of 3625 rpm. The propeller, however, is designed for use with an engine developing 65 horsepower at 4000 rpm. The pitch of the propeller is controlled by displacing hydraulic fluid between the cockpit control and the propeller hydraulic cylinder.

When the hydraulic line separated from the pitch change actuator, the propeller went to full fine pitch which resulted in the propeller overspeeding. The overspeed condition caused the adhesive on the blade shank quadrant gear to release, allowing one blade to shift to negative pitch and causing severe vibration. This situation probably would not have happened had the retaining set screws been properly installed in the quadrant gear.

*CONCLUSIONS:*

**Findings:**
1. The hydraulic line separated from the pitch change actuator under hydraulic pressure, as it was installed with insufficient flare; this caused the propeller to move to fine pitch and to overspeed.

2. The overspeed condition caused the adhesive on the blade shank quadrant gear to release, allowing one blade to move to negative pitch and causing severe vibration.

3. The propeller blade shank quadrant gear retaining set screws were not installed in the quadrant.

4. The propeller was designed for use with a less powerful engine.

**Causes:**
The hydraulic line separated from the pitch change actuator, resulting in the propeller overspeeding and the subsequent severe vibration. The aircraft was not at a sufficient altitude to reach the airport, and the pilot force-landed the aircraft in a field.

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## AIR CADET LEAGUE OF CANADA SCHWEITZER SGS-2-33 C-GCLU PRINCE GEORGE AIRPORT, BRITISH COLUMBIA 22 JUNE 1986

REPORT NUMBER: 86-P60029 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0920 PDT
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 65 | 19 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | 1 |

*SUMMARY REPORT:*

The glider pilot had completed his pre-flight checks and was ready to take off, when the launch was delayed by

the departure of a passenger jet. The glider was pushed off the runway onto the grass, and the spoilers were deployed to secure the plane from the effects of jet blast. After the jet had departed, the glider was pushed back onto the runway and hooked up to the tow plane. The launch assistant, who was holding the wings level, noticed that the spoilers were out as he released the wing. He gave a stop-launch signal; however, the signal was not seen by the glider pilot.

The take-off continued with the glider's spoilers deployed. Shortly after lift-off, the tow pilot found that he was unable to accelerate; so he released the glider to avoid stalling his aircraft. The glider pilot attempted to turn at a very low altitude; the aircraft's right wing contacted the ground, and the glider crashed.

Investigation of the wreckage revealed that the spoilers were still deployed; they had not been closed following the interruption of the first launch by the taxiing passenger jet.

For undetermined reasons, the pilot turned the glider too steeply at low altitude, and the right wing contacted the ground. Although the spoilers were deployed, the area would have been suitable for landing had the aircraft been in the landing attitude.

*FINDINGS:*

**Cause Related:**
1. The pilot did not carry out a complete pre-take-off check, and the glider was launched with the spoilers deployed.

2. The pilot turned too steeply at low altitude, and the right wing tip struck the ground.

**Other:**
-Nil-

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## WIZARD J3B (Ultralight) C-IBLI
## HARDWOOD LANDS, NOVA SCOTIA
## 01 July 1986

BRIEF NUMBER: 86-A65002 (Accident)
LOCAL TIME: 1400 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 40 | 25 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

After departure, the pilot detected a change in the wind and decided to return and land. The wind on take-off was from the north at 15 mph, and it had shifted to 320 degrees at 25 mph. Near the end of the landing roll on runway 36, a gust of wind from the left lifted the aircraft 10 feet into the air. When the gust decreased, the aircraft stalled and struck the ground.

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## ZENITH CH200 (Amateur-built) C-GQWP
## KINGSTON AIRPORT, ONTARIO 10 mi NE
## 07 JULY 1986

REPORT NUMBER: 86-O/60053 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1726 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 261 | 170 |
| LAST 90 DAYS | 12 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot was en route from Morrisburg, Ontario, to Kingston, Ontario, in his amateur-built aircraft. When the aircraft was approximately 10 miles from Kingston, the engine stopped. The pilot informed Kingston radio

that his engine had quit and that he was attempting a forced landing. Just prior to touchdown, the aircraft nosewheel struck a fence post, and, on landing, the nose gear collapsed. The aircraft slid to a stop in a nose-down attitude.

A few days earlier, the pilot had departed Sterling, Ontario, for La Tuque, Quebec, with en route stops at Kingston, Les Cèdres, Quebec, and Trois-Rivières, Quebec. The pilot had refuelled the aircraft to capacity at Les Cèdres and therefore departed with four hours of fuel on board. According to the pilot, the aircraft used approximately two hours of fuel (40 litres) between Les Cèdres and La Tuque.

On the return trip, the pilot was unable to obtain 80 octane fuel at La Tuque; so he flew to Trois-Rivières, a distance of approximately 74 nautical miles, to refuel. The aircraft arrived at Trois-Rivières having used about three hours of fuel since refuelling at Les Cèdres, leaving an estimated 20 litres in the tank.

When the tank was refuelled, only 32 litres were added as the refuelling attendant assumed the tank was full when fuel gushed out of the filler neck. When the aircraft departed Trois-Rivières, it had approximately 50 litres of fuel on board, enough for about two and a half hours of flight.

The distance from Trois-Rivières to Kingston is 211 nautical miles. At 100 knots, the normal cruising speed, the aircraft should have reached Kingston without running out of fuel. However, en route, 21-knot head winds reduced ground speed. Also, the pilot elected to land at Morrisburg, 72 nautical miles east of Kingston, to check the weather by phone, which used up extra fuel.

The pilot departed Morrisburg without refuelling as fuel was not available, and he was apparently unaware of his low fuel status. En route, the pilot was unable to read the fuel gauge accurately because of turbulence.

Examination of the engine, fuel system, and controls did not reveal any faults in those systems which would have contributed to the accident. The single cylindrical fuel tank was found to be empty, as were the lines to the carburettor.

The pilot did not check the fuel quantity in the aircraft after refuelling was completed at Trois-Rivières - 32 litres of fuel were added to the tank; however, calculations show that another 30 litres could have been added. As well, he did not check the fuel quantity while on the ground at Morrisburg.

Examination of the aircraft at the scene indicated that the impact of the nosewheel striking the fence post caused the nosewheel to cock to one side. On touchdown, the nose gear collapsed rearwards, and the aircraft slid on its nose for approximately 250 feet before coming to rest.

***FINDINGS:***

**Cause Related:**
1. The pilot did not ensure that there was adequate fuel on board the aircraft for the intended flight, and, as a result, the engine stopped because of fuel exhaustion.

2. During the forced landing, the aircraft nosewheel struck a fence post, and the nose gear collapsed on landing.

**Other:**
-Nil-

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## BIRDMAN CHINOOK WT 11 (Ultralight) C-IDLM
## MANNVILLE, ALBERTA 12 mi S
## 08 JULY 1986

REPORT NUMBER: 86-W65008 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1530 MDT
OPERATION: Private Other
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 800 | 500 |
| LAST 90 DAYS | 170 | 165 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The ultralight aircraft was in cruise flight at low altitude when the fuselage broke just aft of the cabin structure. The pilot was thrown forward as the tail section folded under. The aircraft went out of control and struck the tree-covered terrain at a steep angle.

The fuselage of the Chinook consists of a four-inch diameter body tube which extends the total length of the aircraft. This body tube supports the cabin structure at the forward end and gives cantilever support to the empennage at the rear. The greatest stress on the body tube is developed at approximately mid-span.

The original design of the body tube included two deficiencies. The first of these was the design of the reinforcing sleeve placed around the body tube at the point of maximum stress. The sleeve ended abruptly, causing further concentration of stress on the body tube. This was the point of failure on C-IDLM.

The second design deficiency involved the rivet holes drilled into the body tube through the reinforcing sleeve to attach certain cabin structure members. These rivet holes also weakened the body tube at its point of maximum stress. Examination of two other aircraft of the same type showed significant crack development circumferentially through these rivet holes.

When the cantilevered body tube of C-IDLM flexed under normal flight loads, it failed at the point of maximum stress at the sudden termination of the reinforcing sleeve. Examination showed the failure to be a high-cycle fatigue failure of the body tube. Secondary cracking was also observed at the rivet holes.

The following laboratory reports were completed: LP 143/86 - Structural Integrity Analysis, Chinook WT 11 C-IDLM; LP 156/86 - Body Tube Failure Analysis, Chinook WT 11 C-IDDF.

*FINDINGS:*

**Cause Related:**
1. The design of the reinforcing sleeve on the body tube induced a stress concentration where the sleeve ended abruptly and caused the body tube to fail in fatigue.

2. The fatigue failure of the body tube was caused by high-cycle flight loads within the normal operating envelope of the aircraft.

**Other:**
1. Secondary cracking in the body tube was observed extending circumferentially from the rivet holes drilled through the reinforcing sleeve into the body tube.

*SAFETY ACTION:*

**Action Taken:**
The aircraft manufacturer has indicated that a corrective modification to increase the fatigue strength of the body tube is being incorporated into all new aircraft of this type and has been recommended to be retrofitted to all existing aircraft of this type.

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## FJ SPECIAL (Amateur-built) C-GBQA
## CARP, ONTARIO
## 20 JULY 1986

REPORT NUMBER: 86-O/60057 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1737 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 922 | 127 |
| LAST 90 DAYS | 44 | 44 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |
| OTHER | - | - | 1 |

*SUMMARY REPORT:*

The small biplane departed runway 28 at Carp Airport in what appeared to be a normal take-off. The aircraft climbed to less than 100 feet above ground level, then suddenly veered about 20 degrees left of the runway, and rolled to the left to an inverted position for a couple of seconds. It then continued in a descending roll to an almost upright position before the right wing tip contacted the ground. The nose of the aircraft dug into the earth, and the aircraft pivoted over backwards and struck a mobile air traffic control (ATC) unit. The aircraft came to rest on its nose, leaning against the cab of the ATC vehicle.

The pilot had participated in the Carp Air Show earlier that day, performing an aerobatic display. At the time of the accident, the aircraft was departing the airport to return to St. Lazare, Quebec. The aircraft was cleared to take off by ATC. The winds were reported to the pilot by ATC as 350 degrees magnetic at 10 to 15 knots.

The ATC unit had been positioned on the field south of runway 28. It was a temporary placement to facilitate the arrival and departure of transient aircraft prior to and after the air show.

There were four people inside the unit at the time of the accident. One occupant was injured by the impact of the aircraft.

As a result of the accident, the pilot suffered a memory loss of the sequence of events that led to the occurrence.

Three witnesses stated that, prior to taking off, the pilot asked the ATC controller if he "could do something on take-off". He did not indicate to the controller what his

intentions were. The controller responded "yes" and proceeded to give the pilot traffic information before clearing him for take-off. After the accident, the pilot did not recall what he had been planning to do on take-off.

The aircraft was examined after the accident. There was no indication that a failure or malfunction of the flight controls or engine occurred prior to impact.

*FINDINGS:*

**Cause Related:**
1. After take-off, the aircraft veered to the left of the runway centre line and began a rolling manoeuvre to the left for undetermined reasons.

2. The pilot was unable to recover from the descending roll before the aircraft struck the ground.

**Other:**
-Nil-

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PITTS S1 C-GURD
WATERLOO-WELLINGTON AIRPORT, ONTARIO
21 JULY 1986

REPORT NUMBER: 86-O/60058 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1125 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,200 | 100 |
| LAST 90 DAYS | 200 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot had been operating in the aerobatics box over the airport for 30 minutes. He landed on runway 32, the aircraft veered right, and the pilot applied left brake and left rudder. The aircraft nosed down, striking its propeller on the runway, and then slid a short distance before coming to rest in an inverted position near the right edge of the runway.

The wind was 050 degrees at five to seven knots. Runway 07 was the most suitable in-to-wind runway; however, it was closed for runway repairs.

When the aircraft veered to the right, the pilot overcorrected during the application of left brake and rudder. The aircraft nosed over because of the harsh application of brake.

*FINDINGS:*

**Cause Related:**
1. The aircraft veered right on landing, and the pilot overcorrected during the application of left brake and rudder, causing the aircraft to nose over.

**Other:**
-Nil-

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PELICAN CLUB (Ultralight) C-IVIP
MONTRÉAL/MASCOUCHE AIRPORT, QUÉBEC
22 JULY 1986

REPORT NUMBER: 86-Q65007 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0740 EDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,800 | 10 |
| LAST 90 DAYS | 30 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The aircraft was on a ferry flight from Mascouche, Québec to Hamilton, Ontario. On initial climb-out, at an altitude of 300 feet above ground level, the engine lost power. During the ensuing forced landing, the ultralight was substantially damaged when it ploughed into the side of a ditch.

Following replacement of a front spark plug, which had been broken during the accident, the engine was ground run, and it was determined to be serviceable. To increase endurance, an extra fuel tank had been installed for the ferry flight. The tank was a four-gallon plastic reservoir, strapped in the right-hand seat. The extra tank was about

four inches below the main fuel tank and had its own shutoff valve and rubber squeeze pump. Its outlet line was connected downstream of the main tank shutoff valve which, when in the OFF position, effectively isolated the extra fuel tank outlet from the main reservoir, but not from the fuel quantity sight gauge connected to the main reservoir's top and bottom. The ferry tank kit had been installed the day prior to the flight, and it had not been systematically ground or flight tested. Prior to take-off, the main fuel tank had been selected off and the ferry tank selected on.

The fuel line and sight gauge contained sufficient fuel for a short ground run, take-off, and lift-off, but once that fuel was exhausted, free air from the top of the main reservoir entered the main fuel stream being pumped from the ferry tank via the empty sight gauge. This caused cavitation in the firewall-mounted suction pump, which led to engine fuel starvation.

*FINDINGS:*

**Cause Related:**
1. The engine lost power because of fuel starvation as a result of a design error of the extended range fuel system.

2. The extended range fuel system modification had not been systematically ground or flight tested.

**Other:**
-Nil-

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SPECTRUM BEAVER RX550 (Ultralight) C-IGOW
BORUPS CORNERS, ONTARIO 2 mi E
01 AUGUST 1986

BRIEF NUMBER: 86-C65009 (Accident)
LOCAL TIME: 1700 CDT
OPERATION: Private Other
DAMAGE: Substantial
PILOT LICENCE: Commercial Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 225 |
| LAST 90 DAYS | 110 | 90 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot took off and was climbing to cruise altitude when the engine (Rotax 503) lost power. He landed the aircraft on a section of the Trans-Canada highway. During roll-out, the pilot steered the aircraft to the left to avoid hitting a highway sign with the right wing. The left wheel contacted the highway shoulder, and the aircraft swung toward the left ditch. The pilot applied right rudder, and the aircraft veered right, crossed the road, and rolled into the right ditch.

The power loss occurred when the piston pin bearing rollers separated from their cage, causing damage to the piston, cylinder, and cylinder head.

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DER CRICKET (Amateur-built) C-GFGD
NAICAM, SASKATCHEWAN 6 mi N
14 AUGUST 1986

BRIEF NUMBER: 86-C60096 (Accident)
LOCAL TIME: 1930 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 30 |
| LAST 90 DAYS | 40 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot took off into a strong gusty wind toward a windbreak of trees atop a rise in the surrounding terrain. Unable to maintain a stable flight attitude because of mechanical turbulence generated by the wind, the pilot chose to land in a field of mature grain. The main landing gear became entangled in the barley stalks, and the aircraft nosed over.

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## MITCHELL U2 (Ultralight) C-IBEH
## SHAUNAVON, SASKATCHEWAN 6 mi SE
## 15 AUGUST 1986

REPORT NUMBER: 86-C65010 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 2000 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 370 | 0 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

The pilot took off from his farm strip for a flight to a nearby airport. The take-off roll was longer than expected, and, on climb-out, the aircraft struck a power line that crossed the flight path. The pilot lost control of the aircraft, and it crashed in a field just beyond the power line.

This was the first flight of the recently built ultralight, and the pilot had not flown this type before. The departure area was of sufficient length for ultralight operation; however, it had been graded a few days prior to this flight, and the surface was loose and soft to a depth of about two inches. Although the pilot realized that the take-off roll had been longer than expected, he continued the climb-out because he thought that he would clear the power line.

Because of the condition of the runway, the aircraft's ground roll was longer than normal. As the pilot had not flown the accident type before, he was not familiar with its climb performance.

*FINDINGS:*

**Cause Related:**
1. The soft surface of the runway resulted in an overly long take-off roll.

2. This was the first flight of the aircraft, and the pilot had no experience on type.

**Other:**
-Nil-

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## BIRDMAN CHINOOK 2S (Ultralight) C-IELB
## BEAUMONT, ALBERTA 1 mi NW
## 18 AUGUST 1986

REPORT NUMBER: 86-W65009 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2130 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 23 | 23 |
| LAST 90 DAYS | 12 | 12 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

Shortly after lift-off, the aircraft started a slow 180-degree turn. It skimmed over a water reservoir, struck the far bank, and bounced up onto level ground.

Although the engine was developing full power, the pilot had lifted off at low airspeed, and the aircraft was unable to climb. He became concerned with the trees and buildings across his flight path, and the aircraft settled as he attempted to turn away from the obstructions.

The lift-off at low airspeed put the aircraft behind the power curve. The attempted turn to avoid the obstructions required more power than the engine was capable of developing, and, as a result, the aircraft settled and struck the bank of the reservoir.

*FINDINGS:*

**Cause Related:**
1. The inexperienced pilot lifted off at a low airspeed with the result that the aircraft was unable to sustain flight.

**Other:**
-Nil-

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BIRDMAN ATLAS 3A (Ultralight) C-IAXI
GRIMSHAW, ALBERTA 2 mi W
28 AUGUST 1986

BRIEF NUMBER: 86-W65010 (Accident)
LOCAL TIME: 2015 MDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 60 | 50 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*REPORTED CIRCUMSTANCES:*

The pilot had taken off from a farm field, and, while the aircraft was at about 80 to 100 feet above ground, the engine stopped. The pilot turned right toward a highway, and, as he lowered the nose, the aircraft turned sharply to the right and struck a power line. The aircraft caught fire and was destroyed. It was not equipped with an airspeed indicator.

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KIT FOX (Amateur-built) C-GIBK
BRANTFORD, ONTARIO
30 AUGUST 1986

REPORT NUMBER: 86-O/60081 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0905 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 480 | 90 |
| LAST 90 DAYS | 20 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

*SUMMARY REPORT:*

On climb-out, at an estimated altitude of 300 feet, the pilot heard a loud bang, and the engine began to overspeed. The pilot immediately throttled back and began a left turn back to the airport. There was insufficient altitude to align the aircraft fully with the intended landing runway, and the aircraft touched down hard on the runway, 30 degrees to the right of the runway heading. The aircraft ran off the right side of the runway and nosed over.

Inspection of the wreckage revealed that the propeller drive belt had failed, and, although the engine was still providing power, the power was not transferred to the propeller. The Rotax 503 engine exceeded both the design horsepower and rpm limits of the belt.

When the propeller drive belt failed, thrust was no longer being produced by the propeller which was instead creating additional drag as it was windmilling. The pilot, in his attempt to turn back to the airport, stalled the aircraft which then landed hard on the runway.

*FINDINGS:*

**Cause Related:**
1. The horsepower and rpm design limits of the propeller drive belt were exceeded.

2. The propeller drive belt failed, causing a loss of power to the propeller.

3. The pilot did not maintain sufficient airspeed during the forced landing, and, as a result, the aircraft stalled and landed hard.

**Other:**
-Nil-

*SAFETY ACTION:*

**Action Taken:**
The Canadian Aviation Safety Board sent an Aviation Safety Advisory to Transport Canada relating to the limitations of propeller belts. Subsequently Transport Canada passed on this information to the Experimental Aircraft Association of Canada (EAAC), Canadian Aerosport Technical Committee (CATC), Ultralight Owners' and Pilots' Association (COPA).

Transport Canada also indicated that a Service Difficulty Alert would be issued to the registered owners of the relevant aircraft.

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WIZARD J3B (Ultralight) C-IBRC
STANLEY, NOVA SCOTIA 4 mi E
30 AUGUST 1986

BRIEF NUMBER: 86-A65003 (Accident)
LOCAL TIME: 0930 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 100 | 25 |
| LAST 90 DAYS | 30 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The aircraft was at 1,100 feet and four miles from destination when the engine stopped. The pilot looked at the transparent fuel tanks and noted they were empty. He selected an area of young trees in which he carried out a forced landing. The aircraft had been airborne for one and one-half hours, which was full fuel tank endurance.

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LAZAIR (Ultralight) C-IDXI
GABRIOLA ISLAND, BRITISH COLUMBIA
30 AUGUST 1986

REPORT NUMBER: 86-P65004 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1220 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 500 | 1 |
| LAST 90 DAYS | 5 | - |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot was making his first take-off in a single-seat Lazair ultralight from a 300-foot long airstrip he and his son had prepared. After lifting off, the ultralight climbed slowly, and the pilot turned to the left to avoid some trees; however, he was unable to prevent the ultralight's left wing from striking 60-foot trees about 600 feet past the end of the airstrip. Following impact with the trees, the ultralight aircraft fell to the ground, seriously injuring the pilot.

The pilot's son had purchased the used Lazair ultralight and transported it to their airstrip where it was reassembled. The pilot and his son had recently undertaken a course in ultralight flying. During this training, the pilot had flown four hours dual and one hour solo in a Beaver ultralight, and he had also made two flights in a two-place Lazair ultralight. Both these ultralights have considerably more power and performance than the single-place Lazair.

Weather was not a factor; it was a warm, clear day with a temperature of about 18 degrees Celsius, and there was no wind.

Examination of the aircraft and engine after the accident revealed no mechanical faults which would have prevented normal operation of the aircraft.

The pilot had not flown the low-powered single-place Lazair before and expected its performance to be comparable to the higher-powered ultralights on which he had trained. This was also his first flight from this airstrip, which he had judged as adequate, based on his experience with the higher performance Lazair two-seater. Following take-off, the utlralight was unable to clear the trees past the end of the airstrip.

***FINDINGS:***

**Cause Related:**
1. The pilot was unfamiliar with the aircraft and anticipated a better level of performance.

2. The aircraft was unable to climb clear of the trees at the end of the runway.

**Other:**
-Nil-

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JODEL F-11 (Amateur-built) C-FHGB
BASSANO, ALBERTA 8 mi SE
31 AUGUST 1986

BRIEF NUMBER: 86-W60054 (Accident)
LOCAL TIME: 1315 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 816 | 566 |
| LAST 90 DAYS | 8 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***REPORTED CIRCUMSTANCES:***

The pilot made two fly-by inspections of the grass field prior to landing. As the aircraft slowed to about 20 miles per hour during the landing roll, the right main wheel struck a hole that the pilot had not seen. The right hand landing gear broke away, and the aircraft collapsed onto the right wing.

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ULTRAFLIGHT MANUFACTURING LAZAIR
(Ultralight) C-IAWE
NIAGARA FALLS, ONTARIO
01 SEPTEMBER 1986

REPORT NUMBER: 86-O/65006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1545 EDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 400 | 0 |
| LAST 90 DAYS | 2 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

***SUMMARY REPORT:***

The pilot had recently purchased the ultralight and transported it to his residence where he reassembled it. The pilot was using an area behind his residence to familiarize himself with the aircraft. The ultralight became airborne, and control was lost; the aircraft veered to the right, and climbed to an altitude of about 30 feet before striking a tree and crashing near a house.

The pilot had not flown this type of ultralight before; his ultralight experience was about one hour dual on a different design ultralight. The pilot stated he had not intended to fly the aircraft at this time or from the site but had intended to later truck it to another site.

The wind in the area was reported as light to calm, and there was no evidence of pre-impact discrepancies in the aircraft structure, engine, or flight controls.

The area used for the take-off was a rough and newly graded construction site. It was bordered by a line of trees and houses on one side and an excavation for a road on the other. An excavation for a new road crossed the take-off path just beyond the point of lift-off. If the ultralight had not become airborne, it is doubtful it could have stopped before it reached the road excavation.

***FINDINGS:***

**Cause Related:**
1. The taxi run was attempted in an unsuitable area.

2. The aircraft became airborne inadvertently; the pilot, who was inexperienced on type, lost control, and the aircraft struck a tree.

**Other:**
-Nil-

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## Annex 1

## List of Reports by Aircraft Manufacturer and Type

## REPORT BY AIRCRAFT MANUFACTURER AND TYPE


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| | | C60068 | 48 |
| | | O60035 | 21 |
| | | O60050 | 05 |
| | | O60054 | 11 |
| | | Q60904 | 50 |
| | | W60014 | 94 |
| | | W60047 | 54 |
| | | W60902 | 02 |
| | 182 | C60012 | 79 |
| | | C60054 | 09 |
| | | P60048 | 27 |
| | | W60015 | 60 |
| | 185 | A60006 | 17 |
| | | A64101 | 57 |
| | | C60014 | 54 |
| | | C60019 | 81 |
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| | | C60029 | 58 |
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| | | W60024 | 63 |
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| | | C60061 | 64 |
| | | C60065 | 12 |
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| | | C60086 | 70 |
| | 206 | C60015 | 54 |
| | | C60085 | 29 |
| | | P60901 | 75 |
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| | | Q60902 | 03 |
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| | | C60039 | 37 |
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| | 86-07-10 | W60030 | 10 |
| | 86-07-22 | W60033 | 66 |
| | 86-07-23 | W60034 | 14 |
| | 86-07-26 | W60036 | 67 |
| | 86-07-31 | W60040 | 16 |
| | 86-08-01 | W60043 | 17 |
| | 86-08-06 | W60042 | 19 |
| | 86-08-13 | W60045 | 72 |
| | 86-08-14 | W60906 | 22 |
| | 86-08-17 | W60047 | 54 |
| | 86-08-18 | W65009 | 92 |
| | 86-08-20 | W60048 | 72 |
| | 86-08-24 | W60050 | 29 |
| | 86-08-28 | W65010 | 93 |
| | 86-08-31 | W60053 | 31 |
| | 86-08-31 | W60054 | 95 |
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| | 86-02-15 | P60005 | 34 |
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| | 86-03-02 | P60007 | 80 |
| | 86-03-04 | P60008 | 53 |
| | 86-03-16 | P65002 | 75 |
| | 86-04-02 | P60013 | 35 |
| | 86-05-06 | P60018 | 63 |
| | 86-05-19 | P60020 | 90 |
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| | 86-07-04 | P60052 | 10 |
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| | 86-03-10 | C60016 | 38 |
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| | 86-05-30 | C60042 | 22 |
| | 86-06-20 | C60048 | 04 |
| | 86-06-22 | C60049 | 43 |
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| | 86-07-09 | C60062 | 64 |
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| | 86-07-20 | C60071 | 66 |
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| | 86-07-11 | A60023 | 11 |
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| Newfoundland & Labrador | 86-01-10 | A60003 | 16 |
| | 86-01-22 | A60005 | 48 |
| | 86-03-11 | A60006 | 17 |
| | 86-04-08 | A60011 | 83 |
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| | 86-06-08 | A60018 | 00 |
| | 86-06-08 | A60019 | 41 |
| | 86-06-20 | A60020 | 23 |
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| | 86-08-02 | A60027 | 18 |
| | 86-08-09 | A60030 | 70 |
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| | 86-05-14 | A64031 | 39 |
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| | 86-07-29 | W60039 | 70 |
| | 86-08-19 | C60085 | 29 |
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| | 86-02-16 | O60007 | 35 |
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| | 86-04-25 | O65001 | 80 |
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| | 86-05-10 | O60034 | 89 |
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| | 86-05-14 | O64068 | 13 |
| | 86-05-15 | O60035 | 21 |
| | 86-05-18 | O60037 | 63 |
| | 86-05-21 | O60038 | 92 |
| | 86-05-24 | O60039 | 93 |
| | 86-05-26 | C60039 | 37 |
| | 86-05-29 | C60041 | 22 |
| | 86-05-29 | C60043 | 59 |
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| | 86-06-15 | O60049 | 61 |
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| | 86-02-15 | Q60006 | 77 |
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| | 86-03-22 | Q60009 | 34 |
| | 86-04-10 | Q64034 | 19 |
| | 86-04-23 | Q60012 | 58 |
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| | 86-05-26 | Q65006 | 81 |
| | 86-05-31 | Q60017 | 95 |
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| | 86-06-08 | Q60019 | 60 |
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| | 86-06-15 | Q60902 | 03 |
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| | 86-07-16 | Q60029 | 46 |
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| | 86-06-21 | C60051 | 62 |
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| | 86-08-10 | C60077 | 72 |
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